Northwest
Territories Local Government
Community Planning Division

COMMUNITY WATER & SANITATION SERVICES -- 1983

BAFFIN REGION NORTHWEST TERRITORIES

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BAFFIN REGION
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Government of the Northwest Territories
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Released under the authority
of the Honourable James J. Wah-Shee
Minister of Local Government

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INTRODUCTION

This is one of two reports on the community water and sanitation services in 1983 in the Keewatin and Baffin Regions of the Northwest Territories. This information should be useful to engineers, planners, public health officials, administrators and others concerned with municipal services and community development including various Territorial and Federal Government Departments, academic institutions and of course the communities themselves.

PURPOSE

The original intent of this project was to compile current data for the "Water and Sanitation Systems Analysis Computer Program." This computer program is utilized by Local Government, Department of Public Works and consultants to assist in the cost-effectiveness analysis of water and sanitation options and to substantiate fiscal budgeting and policies. The data required for the computer analysis is primarily numerical. In order to provide descriptive and background information we decided to update and include the appropriate portions of the book "Community Water and Sanitation Services: Northwest Territories", published in 1981.

Thus this report documents the existing water and sanitation facilities and services with descriptive and detailed information. It was not however intended to provide an evaluation of the current conditions or to recommend improvements.

As well as the information published in this report, photographic documentation of the municipal services was compiled, water samples were obtained from a number of the smaller communities, and trucked service operations such as pumping rates, speed, and turn-around-time were measured.

METHODOLOGY

Information for this report was collected during the summer of 1983. Both co-authors visited the regional headquarters in Frobisher Bay, where information was collected from the files of the Department of Local Government, individual sewage and solid waste inventory reports for each community, and discussions with the Community Planning Officer, Rick Douglas. Additional information was collected through personal communications, by telephone, with municipal administrators, utility system operators and contractors in each community.

FORMAT

The same format is used for both Regional reports. For each community the following is provided:

(1) Location Map
This provides the regional setting for the community.

(2) Airphoto
The water and sanitaton facilities and some landmarks are identified on the community airphotos.

(3) Community Information

This consists of general information on the location, history, population, geology, vegetation, climate and information on municipal services including water supply and distribution, sewage collection and disposal, solid waste management and fire protection.

In updating this information, originally published in "Community Water and Sanitation Services: Northwest Territories", the emphasis was placed on water and sanitation services. Other information was only sporadically modified.

(4) Water and Sanitation Forms

This form contains the necessary information on water and sanitation facilities and services more or less in the format used in the Water and Sanitation Systems Analysis Computer Program. The forms were completed as per the existing conditions in the community.

We attempted to document the types of services provided to each of the buildings in the community. Buildings were separated by ownership and into service groups such as those receiving trucked and those receiving piped services. Trucked serviced buildings were further broken down by plumbing and by sewage services e.g. individual, bagged/bucket sewage or pumpout sewage. Water use and waste generation data was presented when available.

Information on trucked serviced buildings was relatively easier to compile therefore these buildings are better documented. In the largest communities such as Rankin Inlet, and Frobisher Bay, information on the pipe serviced buildings was not collected.

It is hoped that these reports will form a useful reference for the individual communities as well as for all individuals and organizations dealing with the communities.

Bob Milburn, P. Eng.,
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References

1. Cameron, J.J. Northwest Territories Water and Sanitation Systems Analysis Computer Program., Northern Technology Unit, Environmental Protection Service, Environment Canada, Edmonton, Alberta and Water and Sanitation Section, Department of Local Government, Government of the Northwest Territories, Yellowknife, Northwest Territories, 1979.

2. EPEC Consulting Western Ltd., Community Water and Sanitation Services: Northwest Territories, Water and Sanitation Section, Department of Local Government, Government of the Northwest Territories, Yellowknife, Northwest Territories, 1981.

ABREVIATIONS AND SYMBOLS

A.S.L.	above sea level
BOD_5	5-day biochemical oxygen demand
°C	degrees Centigrade
cfs	cubic feet per second
FTU	formazin turbidity units
ha	hectare
HZU	hazen units
HDPE	high density polyethylene
Igal	imperial gallons
Igpcd	imperial gallons per capita per day
Igpm	imperial gallons per minute
JTU	Jackson Turbidity Units
km	kilometre
km/hr	kilometre per hour
kPa	kilopascals
kW	kilowatt
<	less than
L	litres
Lpcd or L/p/d	litres per capita per day
Lpm or L/m	litres per minute
Lps or L/s	litres per second
m	metre
m^3	cubic metres
m^3/s	cubic metres per second
umho/cm	micromhos per centimetre
mg/L	milligrams per litre
mm	millimeter
M.S.L.	mean sea level
NTU	nephelometric turbidity unit
PVC	polyvinyl chloride
s	seconds
SS	suspended solids
TDH	total dynamic head
wm	water main

CONVERSION FACTORS

Volume:

Imperial gallon = 4.546 litres
= 0.004546 cubic meters
= 1.20 U.S. gallons
cubic meter = 1000 litres
= 220 Imperial Gallons
= 1.3 cubic yards

Flow Rate:

litre/second = 0.22 Igal/second
= 13.2 Igal/minute

Pressure:

kilo pascals (kPa) = 0.3346 feet of water

Weight:

pound = 0.454 kilograms
kilogram = 2.205 pounds
ton (British) = 0.91 (metric) tonnes
= 907.0 kilograms
= 2000 pounds

Distance:

mile = 1.609 kilometres
kilometre = 0.6214 miles
= 1000 metres
foot = 0.3048 metres
metre = 3.281 feet
= 100 centimetres
inch = 2.54 centimetres
centimeter = 0.394 inches

Area:

hectare = 2.47 acres

Temperature:

°F	°C
68°	20°
32°	0°
-40°	-40°

°F = (°C x 9/5) + 32 = (°C x 1.8) + 32
°C = (°F - 32) x 5/9 = (°F - 32) x 0.556

SOURCES OF INFORMATION

The following is a list of general information sources used in many of the inventory reports.

1. Bureau of Statistics, Executive Committee Secretariat, Government of the Northwest Territories. Population Estimates, by Ethnicity, Region, and Community, Northwest Territories. June 1981.

2. Statistics Section, Department of Planning and Program Evaluation, Government of the Northwest Territories. Population Projections, Community Tabulations, Northwest Territories, 1978 to 1988.

3. Atmospheric Environment Serivces, Department of the Environment. Temperature and Precipitation, 1940-1970, The North - Y.T. and N.W.T.

4. Northern Canada Power Commission. Utility Service Rate Schedules for 1980.

5. Water and Sanitation Section, Town Planning and Lands Division, Department of Local Government, Government of the Northwest Territories. Water and Sanitation Program, Capital Submission Summary for 1980-81 and Five Year Forecast. January 1980.

6. Government of the Northwest Territories. Community Profiles. August 14, 1979.

7. Department of Local Government, Government of the Northwest Territories. Water and Sanitation Project Costs, A Consolidation of Historical Cost Information. October, 1977.

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9. Research Institute of Northern Canada. Canada North Almanac. 1977.

10. Ministry of Transport, the Chief of Defense Staff. *Northern Supplement Canada North of 60°N, Aerodromes, Radio Aids and Associated Chart Data, Y.T., N.W.T., and Northern Quebec, May 15, 1980*. Produced by Department of Energy, Mines and Resources.

11. Government of the Northwest Territories. Correspondence, memos and reports from files of the Departments of Local Government and Highways and Public Works.

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13. Department of Local Government, G.N.W.T. *Schedule of 1980/81 Contracts for Municipal Services*. April, 1980.

14. G.W. Heinke, E.J. Bowring, University of Toronto. *Community Fire Protection and Prevention North of 60*, April, 1982.

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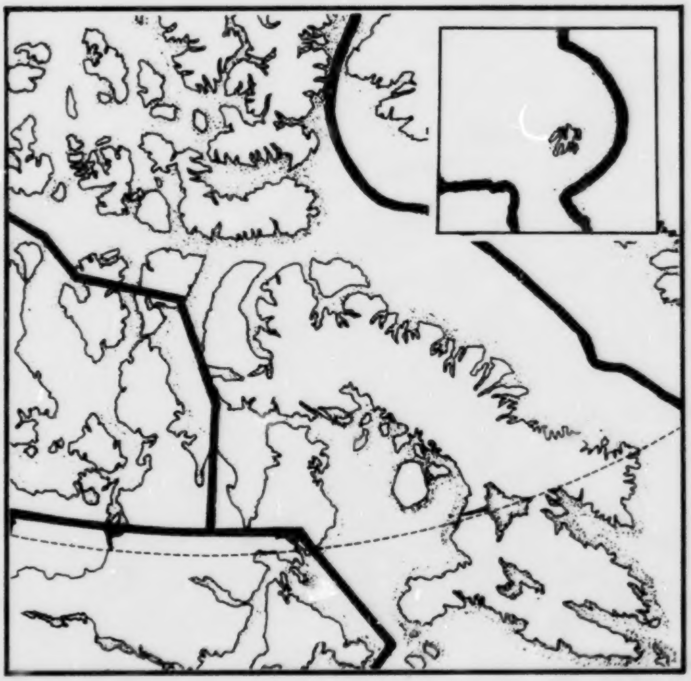
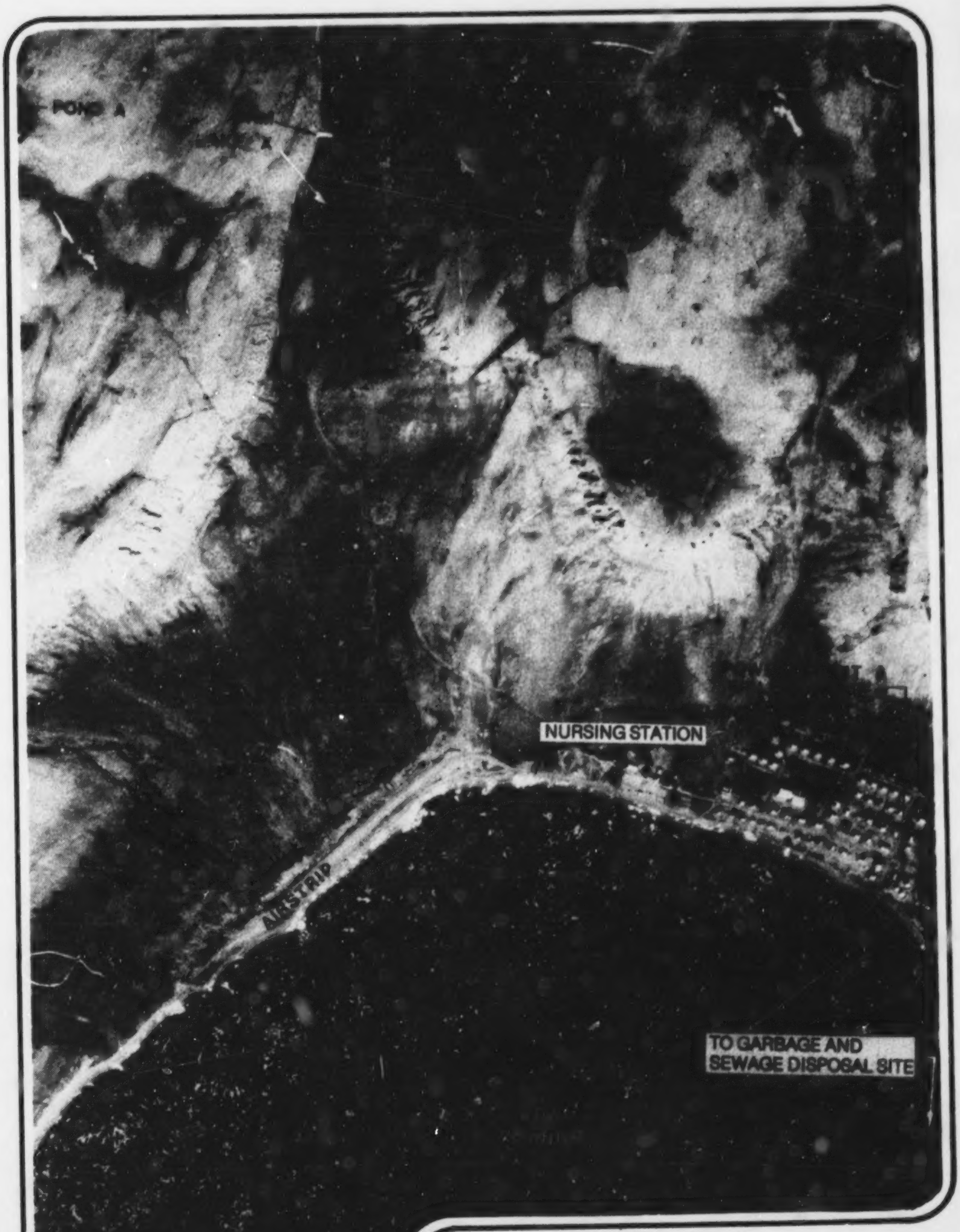
BAFFIN REGION



Arctic Bay



ARCTIC BAY

SCALE - 1:20,000

N.A.P.L.
NO. A24427-104 31/7/76

ARCTIC BAY

A. GENERAL

A.1 Location

Arctic Bay is located on the northern end of Baffin Island at approximately 73°02'N and 85°11'W. It is the most northerly community on Baffin Island and is about 1216 air km northwest of Frobisher Bay.

A.2 History

This community was named after the whaling vessel "Arctic Bay" commanded by Captain William Adams who first visited the Bay in 1872. The Hudson's Bay Company established a trading post at the site during the 1920's. In 1942, the Department of Transportation built a weather station. A school was built by the Federal Government in 1962. There has been a gradual development of the community since that time.

A.3 Community Information

Arctic Bay became a Hamlet in July of 1976. The 98% Inuit population has remained generally stable from 1978 to 1981 with 403 and 375 persons respectively.

The economy is based on wages and handicrafts as well as traditional fishing and hunting. Nanisivik Mines provides employment for a large number of the men. Panarctic also provides some employment from petroleum exploration activities.

Air service is intermittent due to M.O.T. landing restrictions. The airstrip located adjacent to the Hamlet is 490 m X 23 m and surfaced with soil consisting of decayed shale.

A.4 Geology and Terrain

There are some grassy areas on a talus base intermixed with clay in the southern half of the community. The beach consists of 6 m to 20 m of gravel.

Subsurface conditions range from clays mixed with gravel to humus and tundra over continuous permafrost. On the hill rising to Lake "X" colluvial soils are present. There is also some evidence of slow creep (see aerial photo).

A.5 Vegetation

Tundra vegetation consists of arctic willows, grasses, mosses and lichens growing on the humus in the southern part of the Hamlet.

A.6 Climate

Arctic Bay experiences long cold winters and short cool summers. The January high and low temperatures are -25.8°C and -35.5°C respectively. The July high and low temperatures are 10.1°C and -2.1°C. Freeze-up is in September while break-up occurs in July. Prevailing winds are from the north-northwest. Total annual precipitation averages 12.5 cm.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

Water is trucked from Marcil Lake, located approximately 6 km southeast of the community along the road to Nanisivik.

During 1980, construction was completed of the first stage of a project to provide a year-round water supply from Lake "X" and is designed to meet the requirements of Arctic Bay until 1998. The project stages are described briefly as follows:

Stage A - Intake and prime station

Stage B - Dual transmission mains from Lake "X" to the Hamlet

Stage C - Terminal facilities and terminal storage in the Hamlet.

B.1.2 Source

The water supply from Marcil Lake is of good chemical quality. A typical analysis is as follows: (All values in mg/L unless otherwise noted)

Parameters	Values	
	Reservoir	Water Truck
pH	8.01	8.26
Total Hardness (as $CaCO_3$)	200.1	7.9
Total Alkalinity (as $CaCO_3$)	131.4	10.6
Apparent Colour (HU)	-----	12.6
Turbidity (FTU)	0.85	4.40
Calcium (as Ca)	54.0	------
Chloride (as Cl)	133.8	1.8
Sulphate (as SO_4)	70.0	------
Nitrate (as NO_3)	-----	------
Total Iron (as Fe)	-----	0.16

(Water sample taken November 10, 1982 for Environmental Health Officer, Health & Welfare Canada)

B.1.3 Intake Facilities and Supply Line

The new intake structure will extend about 162 m into Lake "X" and will be situated approximately 2.5 m below the water surface. The intake pipe details include a 150 mm HDPE series 160 supply pipe enclosed in a 250 mm steel pipe, schedule 60 with 25 mm polyurethane insulation covering.

The screened intake will draw water from about 0.5 m above the lake bottom. The intake will connect to the prime station located at the south end of the lake. A syphon effect will draw the water over the slight hill at the south end of the lake and down the supply line.

Lake "X" is located approximately 100 m higher in elevation than the terminal facilities. The tank will be filled by gravity syphon through the transmission main.

The transmission main consists of two pipes - a supply pipe and a smaller return pipe. Specifications for the supply pipe are as follows:

Length: 1000 m
Type: HDPE Series 160
Diameter: 100 mm
Insulation: 75 mm polyurethane, c/w 22 guage lock-seam spiral wound steel jacket.

Return Pipe - 75 mm diameter - same materials specifications as for the supply pipe.

Access to each pipe has been provided at 60 m intervals to allow thawing with a tube and heated water.

B.1.4 Treatment

A hypochlorinator will be included in the terminal facilities located in the Hamlet. It will consist of a flow meter-paced chemical pump system using a calcium hypochlorite solution. Presently there is no treatment of the water.

B.1.5 Storage

A 90 m^3 (20,000 Igal) storage tank will be provided under Stage C for fire storage. This system is designed for a population of 780 with a design consumption of 157 Lpcd (34.5 Igpcd). A fire hydrant will also be located in the terminal building. The design consumption is based on a future distribution system which is to be a combination of piped and truck water delivery.

The storage tank will be located adjacent to the terminal facilities in the settlement.

B.1.6 Terminal Facilities

The terminal facilities which are to be constructed under Stage C of the new water supply system will be located in the Hamlet (see aerial photo). The major components of the system are as follows:

Water Circulation Pumps (2) (plus one spare provided) - for return line.

- Capacity: 2.3 L/s @ 90 kPa TDH (30 Igpm @ 30' TDH)
- Type: In-line centrifugal

Truck Fill Pump (1)

- Capacity: 7.5 L/s @ 90 kPa TDH (100 Igpm @ 30' TDH)
- Type: In-line centrifugal

Tank Recirculation Pumps (2)

- Capacity: 0.75 L/s @ 60 kPa TDH (9.9 Igpm @ 20' TDH)
- Type: In-line centrifugal

The building will include boilers and heat exchangers for recirculation with freeze protection of water in both the supply line system and the storage tank. Chlorination facilities will also be provided as described earlier.

B.2 Water Distribution

B.2.1 Trucked System

Water distribution is entirely by trucked delivery and is handled by the Hamlet. At present, it is trucked from Marcil Lake and distributed to holding tanks in each building. A 4540 L (1000 Igal) wheeled truck is used for delivery three times per week.

B.3 Sewage Collection

Bagged sewage is collected by the Hamlet 3 times per week with a 4-wheel drive stake truck. Pumpout sewage is collected 3 times per week with a 4540 L (1000 Igal) capacity sewage pumpout truck operated by the Hamlet of Arctic Bay.

B.4 Sewage Disposal

Bagged sewage is disposed of along with the solid waste at the present disposal site, 1.5 km southeast of the Hamlet. Liquid sewage is released into a holding pond located near the garbage dump site.

B.5 Solid Waste

Solid waste is collected and deposited along with the sewage bags at the disposal site southeast of the community. Garbage is burned occasionally, and sometimes covered.

B.6 Roads

All the buildings in the community are accessible by roads. They are surfaced with granular materials obtained from nearby borrow areas. The roads have been constructed on the existing soil without any excavation. The material has a tendency to break down under extensive use.

8.7 Surface Drainage

There are no serious drainage problems in Arctic Bay. Development has maintained most of the natural drainage patterns. Culverts are provided to allow for effective drainage through the community.

8.8 Fire Protection

The fire protection system of Arctic Bay is comprised of eight volunteers, a 160 kg (350 lb) dry chemical extinguisher, and a mini-pumper fire truck. In the future, a hydrant at the terminal facilities will provide added fire protection capabilities.

8.9 Other Services

Other services include a nursing station with two nurses, a primary school and telephone services. There are radio and television services but no newspaper. Power is supplied by NCPC to the Hamlet with diesel generated facilities.

SOURCES OF INFORMATION

1. Makale, Holloway and Associates Ltd., Arctic Bay Development Plan, December, 1976.
2. F. Morison, Arctic Bay Water and Sanitation Report, November, 1978.
3. Health and Welfare Canada, Medical Services (Jack Grainge), Report on Water Supplies and Waste Disposal, Arctic Bay, N.W.T., November, 1976.
4. Government of the N.W.T., Department of Public Works, Project: Water Supply System, Arctic Bay, N.W.T., March, 1980.
5. Government of the N.W.T. Department of Public Works, Contract Documents for Arctic Bay Water Supply, March, 1980 (Consultant: M.M. Dillon, Consulting Engineers & Planners.)
6. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, N.W.T., Personal Communication, June, 1983.
7. Pearce, Frank, Secretary Manager, Hamlet of Arctic Bay, Personal Communication, June, 1983.
8. Government of the N.W.T. Department of Local Government, Sewage and Solid Waste Inventory Report, Arctic Bay.

1. GENERAL INFORMATION

Name: Arctic Bay
Region: Baffin
Classification hamlet
Code Number 703
Northern Community Index: 1.77
Annual Growth Rate (%) 3.0
Community Population:
Total: 375 Year: 1981
Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Marcil Lake
Type: Lake

3. WATER TREATMENT

Type: None

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None
Trucked(km): 6.0

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. **TRUCKED DISTRIBUTION AND COLLECTION**

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	23000/yr	24000/yr	23000/yr	23000/yr
Number of Helpers	1	0	1	1
Helpers Wages $/hr	17000/yr	0	22000/yr	22000/yr

Distance Between Buildings (m): 10

Vehicle Fuel Cost ($/L): 0.60 Vehicle Freight Rate ($/kg): 0.87

11. **LIFT STATION**

Type: None

12. **TRANSPORT TO DISPOSAL**

Sewage Disposal Distances: Piped(m): None
Trucked(km): 1.5

Garbage Disposal Distance (km): 1.5 Honeybag Disposal Distance (km): 1.5

13. **SEWAGE TREATMENT**

Type: Holding Pond

14. **SEWAGE DISPOSAL**

Name: Adams Sound
Type: Holding Pond

15. **GARBAGE TREATMENT**

Type: Burning

16. **GARBAGE DISPOSAL**

Type: Land

17. **HONEYBAG TREATMENT**

Type: None

18. **HONEYBAG DISPOSAL TYPE**

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	
Number of Buildings	29	43	1	1	
Persons Per Building	5.2 (E)	5.2(E)	119	NA	
Water - Service	T	T	T	T	
- Use (L/d)	U	U	U	U	
- Container (L)	1135 (A)	204 (A)	5448	U	
Sewage - Service	PO	HB	PO	HB (a)	
- Production (L/d)	270.8(b)	7.06 (b)	U	U	
- Container (L)	1135 (A)	30	U	30	
Garbage - Production (m^3/d)	0.062(b)	0.062(b)	0.141(b)	U	
- Container (m^3)	0.2	0.2	0.2	0.2	

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

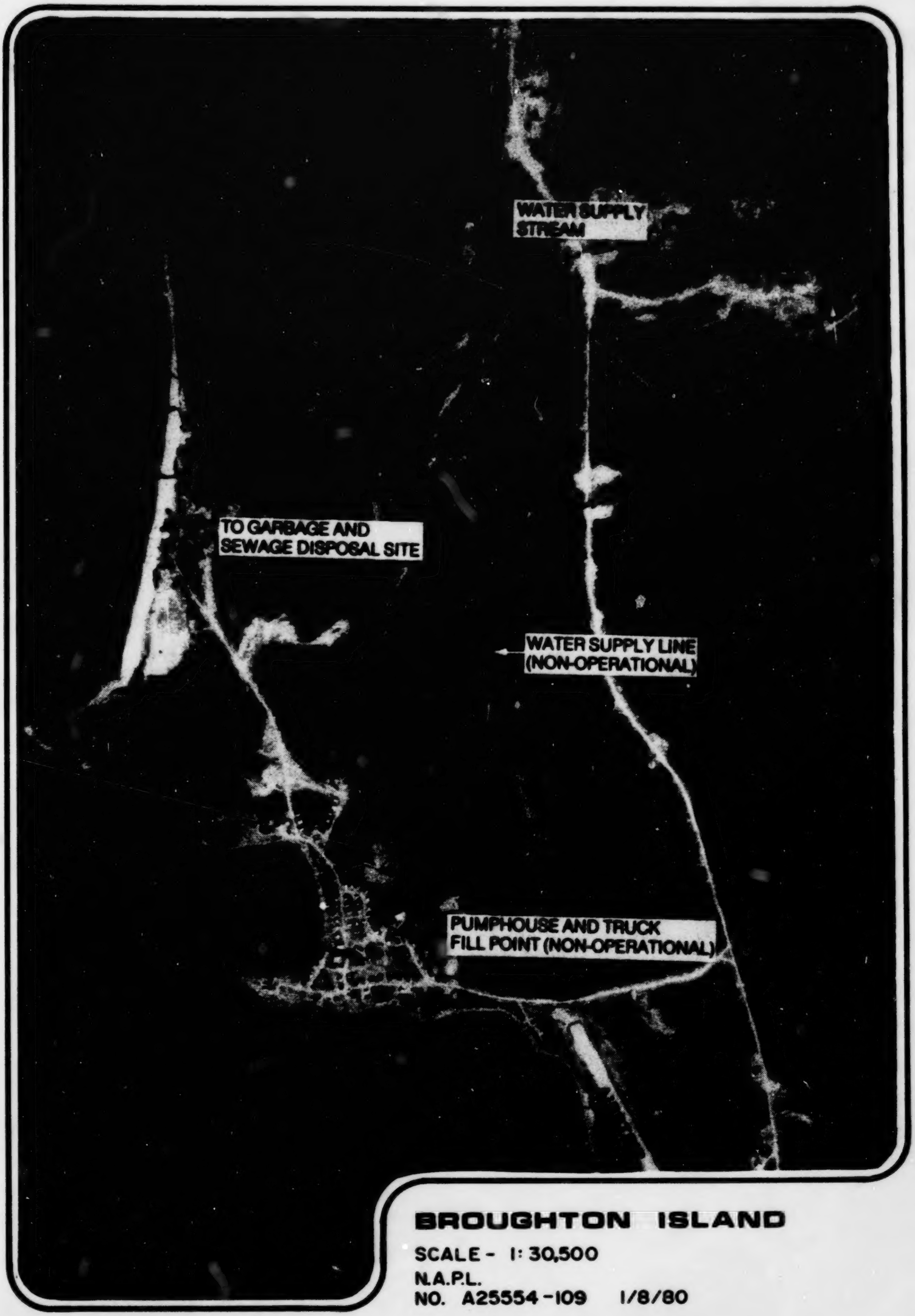
1. Residential with pressure systems.
2. Residential without pressure systems.
3. School.
4. Hotel.

NOTES:

(a) To be converted to pumpout.

(b) Based on data from Sewage and Solid Waste Inventory Report, Arctic Bay. (See Sources of Information)

Broughton Island


WATER SUPPLY STREAM
TO GARBAGE AND SEWAGE DISPOSAL SITE
WATER SUPPLY LINE (NON-OPERATIONAL)
PUMPHOUSE AND TRUCK FILL POINT (NON-OPERATIONAL)

BROUGHTON ISLAND

SCALE - 1: 30,500
N.A.P.L.
NO. A25554-109 1/8/80

BROUGHTON ISLAND

A. GENERAL

A.1 Location

The community of Broughton Island is located on Broughton Island just off the easterly coast of Baffin Island at latitude 67°33'N longitude 64°02'W. It is approximately 480 air km north of Frobisher Bay.

A.2 History

This community was established in 1956-57 when people came to work on the new DEW line site. Families moved to the island from Pangnirtung, Kivitok and also from Padloping Island when it was closed down in the 1960's. An administrative office was established in 1958 and the Hudson's Bay Company opened its post in 1960.

A.3 Community Information

Broughton Island became a Hamlet in August, 1979. Its population for the years 1978-1981 was as follows:

POPULATION	YEAR
329	1978
314	1979
323	1980
378	1981

The community is about 98% native with hunting, sealing, fishing and crafts being the main activities. Community services include a nursing station, primary school, Anglican Church, Hudson's Bay store, community centre and some recreation facilities.

A 1060 m (3475') airstrip is located south of the community at elevation 4.6 m (15') ASL.

A.4 Geology and Terrain

The area is characterized by glacial drift, consisting of low sandy hills, moraines and outwash deposits that cover much of the bedrock. Outcrops of bedrock are evident throughout the settlement area. The natural soils in the area are a mixture of fine rock silt mixed with beach sand and gravels.

A.5 Vegetation

The tundra vegetation in the area consists of mosses and lichens growing on humus material.

A.6 Climate

This area experiences long cold winters with mean high and low temperatures of -20.7°C and -27.6°C respectively. Summer mean high and low temperatures are 8.3°C and 2.0°C respectively. The total yearly precipitation averages at 29.7 cm. Winds are generally from the northwest.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 Water Source and Storage

The water source for the Hamlet is a stream located east of the community (see aerial photo). A 150 mm diameter HDPE pipe, approximately 300 m in length, connects the stream to the reservoir for refill by gravity each summer. Presently however, this line is not in operation. The reservoir is located approximately 2.5 km east of the community. It was constructed in 1978 to provide for winter storage of water. It is about 90 m X 90 m by 10 m deep and is designed to operate with 1 m freeboard and 1.5 m maximum ice thickness, leaving 7.5 m of water depth for use during the winter. The reservoir capacity under winter design conditions is about 20,000 m^3. This will provide approximately 8 months storage for a future design population of 876 and a maximum anticipated consumption rate of 90 Lcpd (20 Igpcd).

Due to the fine silts in the site construction materials, the reservoir was lined with Dupont 3110 membrane material.

The domestic water source is of acceptable chemical quality as evidenced by the following typical chemical analysis. (All values mg/L unless otherwise noted.)

Parameters	Values
pH	6.86
Total Hardness (as $CaCO_3$)	4.1
Total Alkalinity (as $CaCO_3$)	4.6
Apparent colour (HZU)	4.9
Turbidity (FTU)	3.0
Calcium (as Ca)	0.3
Chloride (as Cl)	21.8
Nitrate (as NO_3)	<0.1
Total Iron (as Fe)	0.2

(Sample taken March 24th, 1983 for Environmental Health Officers, Health and Welfare Canada, from water truck.)

B.1.2 Intake and Supply Line

A 150 mm diameter HDPE line draws water from the bottom of the reservoir and extends approximately 2460 m to the truck delivery point in the Hamlet. The line is insulated using 50 mm of polyurethane with 45 mil polyethylene jacket. A 37 mm diameter series 160 HDPE recirculating line is situated inside the water supply line for protection against freezing. Water for recirculation is heated by boilers located in the water distribution point building. This supply line, however, did freeze and subsequently is no longer used.

The graded supply line delivered water by gravity from the reservoir to the Hamlet. With a head difference of approximately 56 m, sufficient operating pressure was available at the truck fill point. The shallow bury pipe had a minimum of 700 mm cover with 1000 mm cover in traffic areas.

B.1.3 Water Distribution Point

Due to the freezing of the supply line, the truck fill point was also rendered non-operational, and presently is not used.

The truck loading pumps in the station are in-line type pumps with the following characteristics:

Number: 2 (one stand by)
Capacity: 7.6 L/s @ 63 kPa TDH (100 Igpm @ 21' TDH)
Motor: 7.5 kW, 3/60/600 volt, 1750 RPM.

A heat exchanger was provided and pumping of heated water through the recirculation line was designed to prevent freezing of the supply pipe. Specifications are as follows:

Circulation Pumps

Number: 2 (one standby)
Capacity: 1.2 L/s @ 861 kPa TDH (16 Igpm @ 289' TDH)
Type: Askal Boiler Feed Pump, Model X
Motor: 2.23 kW, 3/60/600 volt, 750 RPM

Water was chlorinated at the water distribution point using a Wallace and Tiernan A-588 hypochlorinator. Calcium hypochlorite solution was used as the chlorine feed material. The water was also aerated to overcome taste and odour problems in winter and early spring.

At the present time water is picked-up by the water truck directly from the reservoir. Treatment consists of direct addition of bleach to the water in the delivery truck tank.

B.2 Water Distribution

All domestic water is distributed to users by way of truck delivery. The Hamlet uses a 1978 4540 L (1000 Igal) water truck to deliver water to the residents. A second water truck will be arriving during the summer of 1983 via the sealift. Water is delivered to each house 3 times per week. Ice is sometimes delivered when the water truck breaks down.

B.3 Sewage Collection

B.3.1 Bagged Sewage

There are 48 residences in Broughton Island which utilize bagged sewage. The bagged sewage is placed outside each home in half barrels. Collection is provided by the Hamlet twice a week, using a 4-wheel drive stake truck.

B.3.2 Sewage Pumpout

Pumpout of sewage holding tanks in Broughton Island is done by the Hamlet. A 4540 L (1000 Igal) capacity sewage pumpout truck provides this service 3 times per week, co-ordinated with the water delivery.

B.4 Sewage Disposal

Both bagged sewage and liquid sewage pumpout are disposed of at the existing dump site located 1.5 m northeast of the Hamlet. Greywater is currently deposited directly onto the ground outside of the residences.

B.5 Solid Waste

Garbage is collected from empty oil drums in front of the homes and is trucked to the dump site 1.5 km northeast of the Hamlet, and deposited together with the sewage wastes. Bagged sewage, garbage and combustibles are separated to some extent with burning taking place occasionally. The material is compacted and covered with earth materials from time to time.

B.6 Roads and Drainage

The roads are gravel surfaced. A good source of granular material is available nearby the shore where gravels are prevalent. Towards the interior of the Hamlet, however, the soil is less impervious and run-off, together with greywater, often collects in puddles, creating nuisance problems.

B.7 Fire Protection

- 10 man volunteer fire department;
- alarm boxes on telephone poles; and
- tracked Muskeg Bombardier with a capacity of 1703 L (375 Igal)

B.8 Other Services

- Power operated by NCPC
- Telephone provided by Bell Canada
- local radio station
- no newspaper or T.V.
- two flights weekly from Frobisher Bay

SOURCES OF INFORMATION

1. F.J. Williams & Associates, Investigation and Report on Development and Settlement at Broughton Island, N.W.T., December 1965.

2. Jack Grainge, Regional Engineer, Department of Health and Welfare, Water Supplies and Wastes Disposal, Broughton Island, N.W.T., November, 1976.

3. Department of Public Works, Government of N.W.T., Broughton Island Water and Sanitation Report, March, 1978.

4. W.L. Wardrop & Associates Ltd., Baffin Region Water Supply Program, Broughton Island, March, 1982.

5. J.L. Richards & Associates Ltd. Broughton Island and Pond Inlet - Water Distribution Points - 1979 Contract Documents.

6. Currie, Jim, Secretary Manager, Hamlet of Broughton Island, Personal Communication, June, 1983.

7. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, N.W.T., Personal Communication, June 1983.

8. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Broughton Island.

1. GENERAL INFORMATION

Name: Broughton Island

Region: Baffin

Classification Hamlet

Code Number 806

Northern Community Index: 1.75

Annual Growth Rate (%) 3.0

Community Population:

Total: 378 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Water Supply Stream

Type: Stream

3. WATER TREATMENT

Type: Addition of Bleach

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 2460 (not used)

Trucked(km): 2.5

6. COMMUNITY WATER STORAGE

Capacity (L): 2.1×10^7 (reservoir)

7. WATER DISTRIBUTION PUMPHOUSE

Type: Not Used

8. TRUCK FILL POINT

Type: Not Used

9. PIPED DISTRIBUTION AND COLLECTION

Type: Not Used

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	9.94	10.52	11.80	11.80
Number of Helpers	1	0	1	1
Helpers Wages $/hr	8.13	0	10.17	10.17

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.58 Vehicle Freight Rate ($/kg): 1.11

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 1.5

Garbage Disposal Distance (km): 1.5 Honeybag Disposal Distance (km): 1.5

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: Land

15. GARBAGE TREATMENT

Type: Burning/Land Fill

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	38	48	3	3	4
Persons Per Building	4.4(E)	4.4(E)	N/A	N/A	125(a)
Water - Service	T	T	T	T	T
- Use (L/d)	281.3(b)	U	142.7(b)	U	142.7(b)
- Container (L)	1135(A)	204(A)	U	U	3900(a)
Sewage - Service	PO	HB	PO	HB	PO
- Production (L/d)	193.3(b)	34.0(b)	U	U	142.7
- Container (L)	U	30	U	30	4540(a)
Garbage - Production (m^3/d)	0.046(b)	0.046(b)	U	U	0.216(a) (b)
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

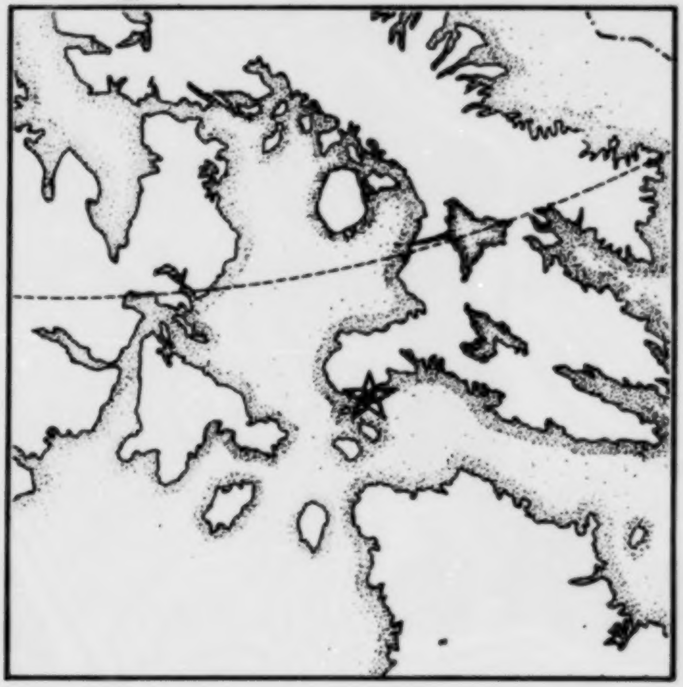
BUILDING CATEGORIES:

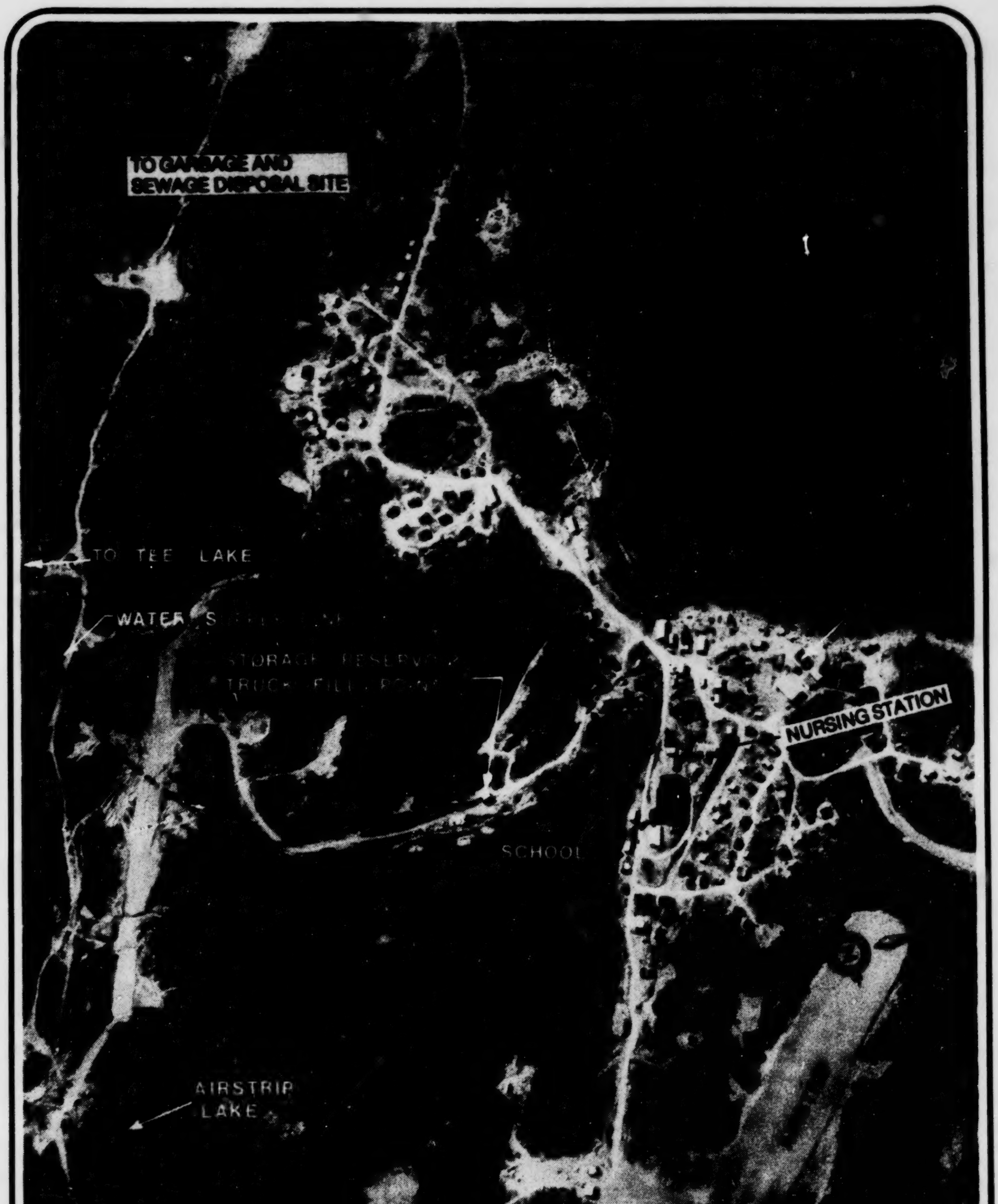
1. Residential with pressure system
2. Residential without pressure system
3. Nonresidential with pressure system including: Nursing Station, 2 Hamlet Buildings
4. Nonresidential without pressure system
5. School

NOTES:

(a) Combined value for all buildings in this category
(b) Based on data from Sewage and Solid Waste Inventory Report, Broughton Island. (See Sources of Information).

Cape Dorset





CAPE DORSET

SCALE - 1:7,500

N.A.P.L.
NO. A25554-70 & 72 31/7/80

CAPE DORSET

A. GENERAL

A.1 Location

Cape Dorset is situated at latitude 64°14'N and longitude 76°32'W. It is located on Dorset Island off the southwest coast of Baffin Island, approximately 400 km west of Frobisher Bay.

A.2 History

Cape Dorset was named by Captain Luke Foxe on September 24, 1631 after Edward Sackville, Earl of Dorset. The Hudson's Bay Company established a post in 1913. The Roman Catholic Church had a mission in the settlement from 1938-1960. The Anglican Church was built in 1961. The West Baffin Co-op began in 1959 and the R.C.M.P. established a post in 1965.

A.3 Community Information

Cape Dorset became a Hamlet on April 1, 1982. The population figures for the past four years are as follows:

POPULATION	YEAR
693	1978
725	1979
763	1980
784	1981

The mainstay of the economy is art work such as soapstone carvings and prints. Hunting and fishing also provide employment for the local people, as does the Co-op and the local government.

Services include a nursing station, public school (grades 1 to 9), Anglican Church, a community centre and an Inn. A 1220 m (4000') gravel landing strip by the community is at an elevation of 48 m (158') ASL.

A.4 Geology and Terrain

Most of the area consists of exposed bedrock. Areas of soil cover are created by the weathering action on the granite bedrock. The soil consists of granular matter ranging from fine sand to gravel and rock fragments. The community occupies two minor coastal valleys. Extensive mud flats are found at the valley mouths.

The permafrost is found at an average of 0.60 m to 0.75 m below the surface.

A.5 Vegetation

Cape Dorset is located in a harsh eastern Arctic climate. This area supports various species of tundra vegetation, with lichens being the most predominate.

A.6 Climate

The July high and low temperatures are 7.2°C and 3.3°C respectively, while the January highs and lows are -23.3°C and -28.9°C respectively. The average annual precipitation can be divided into 152 mm of rain and 1178 mm of snow. Winds are generally from west and northwest and average 18 km/h.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

Previous to 1972, two methods were used to obtain water. During the summer, water was drawn from a small stream running through the community; from November to June, the settlement utilized ice blocks taken from Airstrip Lake in the fall.

The present system in general consists of intake facilities pumping from Tee Lake to a preheating system located near the lake at a high point above the community. From the heater house, water is discharged and flows by gravity to a water storage tank and truck fill point adjacent to the community.

B.1.2. Source

Tee Lake, about 1 km south of the settlement, is used as the domestic water source. The catchment area for Tee lake is about 90 ha and provides the lake with approximately 227,000 m^3 of surface run-off each year.

The quality of the water from a chemical standpoint is acceptable as indicated in the following analysis. (All values in mg/L unless otherwise noted).

Parameters	Values
pH	6.93
Total Hardness (as $CaCO_3$)	46.9
Total Alkalinity (as $CaCO_3$)	42.2
Apparent Colour (HU)	8.9
Turbidity (FTU)	0.79
Calcium (as Ca)	---
Chloride (as Cl)	15.0
Sulphate (as SO_4)	---
Nitrate (as NO_3)	---
Total Iron (as Fe)	0.09

(Sample taken January 28, 1983 For Environmental Health Officer, Health & Welfare Canada)

B.1.3 System Description

The water intake located at the south end of Tee Lake consists of a submersible pump discharging through 60 m of 64 mm diameter galvanized victaulic coupled Schedule 40 steel pipe. It is insulated with polyurethane and heat traced with Pyrotenax insulated cables strung internally. Pump specifications are as follows:

Capacity: 6.4 L/s @ 180 kPa TDH (84 Igpm @ 60' TDH)
Motor: 600 volt, 60 Hz, 3-phase

The intake pipeline connects to the heater house located at the high point in the system. The heater house contains circulating heaters and a 1200 L head tank. The circulation heaters are Chromalox Type NWH-6, 3 kW elements.

Water flows by gravity from the head tank at the heater building through a supply line discharging to the storage facilities near the community. The heater house is situated about 124 m higher in elevation than the storage tank. The supply pipe has the following specifications.

Length: 2042 m
Diameter: 75 mm
Material: Galvanized victaulic coupled schedule 40 steel pipe ASTM A53
Insulation: 38 mm polyurethane foam with galvanized sheet steel sleeve
Heating: Internally placed Pyrotenax insulated cables strung in 152 m (500') sections

The heating cable has four major purposes:
(a) to pre-heat the empty pipe prior to pumping (when temperature dictates);
(b) heat the pipe after pumping to facilitate drying;
(c) to thaw the pipes should they freeze full; and
(d) in certain temperatures heat trace is kept on during pumping.

Normal cold weather operation of the supply system is as follows:

- pre-heat supply pipeline prior to pumping;
- shut off heating cable and engage supply pump and water circulation heaters in heater house to heat water during pumping cycle; and
- post heating of pipeline to allow pipe to dry after draining.

For warm weather operation, the preheat period is eliminated.

B.1.4 Treatment

At present, treatment consists of the addition of bleach to the water tank truck prior to distribution.

B.2 Water Distribution

Water is distributed by using two 4540 L (1000 Igal) wheeled trucks. The water is drawn from the bottom of the storage tank to the water truck using a truck mounted pump. The Hamlet provides water delivery two times per week.

The school is the largest single consumer. The main section of the school has three storage tanks with a total capacity of 31,675 L (6968 Igal). The original section of the school has a 900 L (200 Igal) storage tank.

B.3 Sewage Collection

B.3.1 Sewage Pumpout

The sewage collection contract is held by the Hamlet Council. One pumpout truck with a capacity of 4540 L (1000 Igal) is used for sewage pumpout 2-3 times per week.

B.3.2 Bagged Sewage

Bagged sewage is placed outside homes in 204 L (45 Igal) barrels and is collected daily. This service is provided by the Hamlet with a 4-wheel drive stake truck.

Wash water is disposed of on the ground outside buildings not equipped with sewage pumpout tanks.

B.4 Sewage Disposal

Bagged sewage is disposed of in a pit at the disposal area 1.0 km west of the community. It is separated from the solid wastes. Pumpout sewage is released into a holding pond located adjacent to the disposal area. Sewage eventually seeps into Tellik Inlet, where it is released into the ocean.

B.5 Solid Waste

Garbage is collected twice a week by the Hamlet with a 9.2 m^3 Haul-All garbage truck.

The solid waste disposal area is located 1.0 km west of the community. Garbage is disposed of in a pit, and is separated from the bagged sewage. Regular burning takes place, and landfill operations are practiced when necessary.

B.6 Roads

All roads are gravel surfaced and maintained in passable condition for wheeled vehicles year round.

B.7 Surface Drainage

Surface drainage is a problem due to the impervious nature of the soils. Wash water that is discarded on the ground around homes tends to collect into puddles as a result.

B.8 Fire Protection

The fire protection in Cape Dorset consists of the following:

- twenty person volunteer brigade and Fire Hall;
- one zone system; call boxes are located throughout the community and are connected directly to a siren; and
- one 47 L/s Standard Triple Combination Pumper.

B.9 Other Services

Telephone - Bell Canada
Local Newspaper - Cape Dorset Newsletter
Radio & T.V. - C.B.C. Northern Service
Power - NCPC - 1200 kW diesel generator

SOURCES OF INFORMATION

1. W.L. Wardrop & Associates Ltd., Water Supply System Operation and Maintenance Manual, Cape Dorset, N.W.T., October, 1973.

2. R. James, Cape Dorset Water Supply Line System Upgrading, December, 1977.

3. J.L. Richards & Associates Ltd., General Development Plan, Cape Dorset, N.W.T., October, 1972.

4. W.L. Wardrop & Associates Ltd., Baffin Region Water Supply Program, March, 1972.

5. Jack Grainge, Report on Water Supplies & Waste Disposal, Cape Dorset, N.W.T., March, 1977.

6. Neil Bryant, Water Resources D.I.A.N.D., Review of Municipalities, Settlement of Cape Dorset, July, 1979.

7. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

8. Manning, Charlie, Secretary Manager, Hamlet of Cape Dorset, Personal Communication, June 1983

1. GENERAL INFORMATION

Name: Cape Dorset

Region: Baffin

Classification: Hamlet

Code Number: 803

Northern Community Index: 1.63

Annual Growth Rate (%): 2.9

Community Population:

Total: 784 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Tee Lake

Type: Lake

3. WATER TREATMENT

Type: Addition of Bleach

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 2.0

Trucked(km): 0.3

6. COMMUNITY WATER STORAGE

Capacity (L): 90800

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: Yes

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	2 @ 4540 L	4540 L	5.2 m^3	9.2 m^3
Drivers Wages $/hr	12.86	12.86	12.86	12.86
Number of Helpers	1	1	1	1
Helpers Wages $/hr	11.46	11.46	11.46	11.46

Distance Between Buildings (m): 20

Vehicle Fuel Cost ($/L): 0.58

Vehicle Freight Rate ($/kg): 0.77

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 1.0

Garbage Disposal Distance (km): 1.0

Honeybag Disposal Distance (km): 1.0

13. SEWAGE TREATMENT

Type: Holding Pond

14. SEWAGE DISPOSAL

Name: Tellik Inlet
Type: Holding Pond

15. GARBAGE TREATMENT

Type: Burning/Cover

16. GARBAGE DISPOSAL

Type: Pit

17. HONEYBAG TREATMENT

Type: Pit

18. HONEYBAG DISPOSAL TYPE

Type: Pit

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	35	100	6	9	2
Persons Per Building	5.8 (E)	5.8 (E)	N/A	N/A	251
Water - Service	T	T	T	T	T
- Use (L/d)	186.7(b)	96.3 (b)	420.5(b)	180 (b)	3723 (a)
- Container (L)	1135 (A)	204 (A)	U	U	32575(a)
Sewage - Service	PO	HB	PO	HB	PO
- Production (L/d)	141.5(c)	U	321.6(c)	U	3723 (a)
- Container (L)	U	30	U	30	31780(a)
Garbage - Production (m^3/d)	U	U	U	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure systems
2. Residential without pressure systems
3. Nonresidential with pressure systems including: NCPC, RCMP, Nursing Station, Hamlet Office, Airport, Daoust Construction
4. Nonresidential without pressure systems
5. School

NOTES:

(a) Combined capacity/use for both buildings
(b) Based on water delivery records for March 1983
(c) Based on sewage pumpout records for March 1983

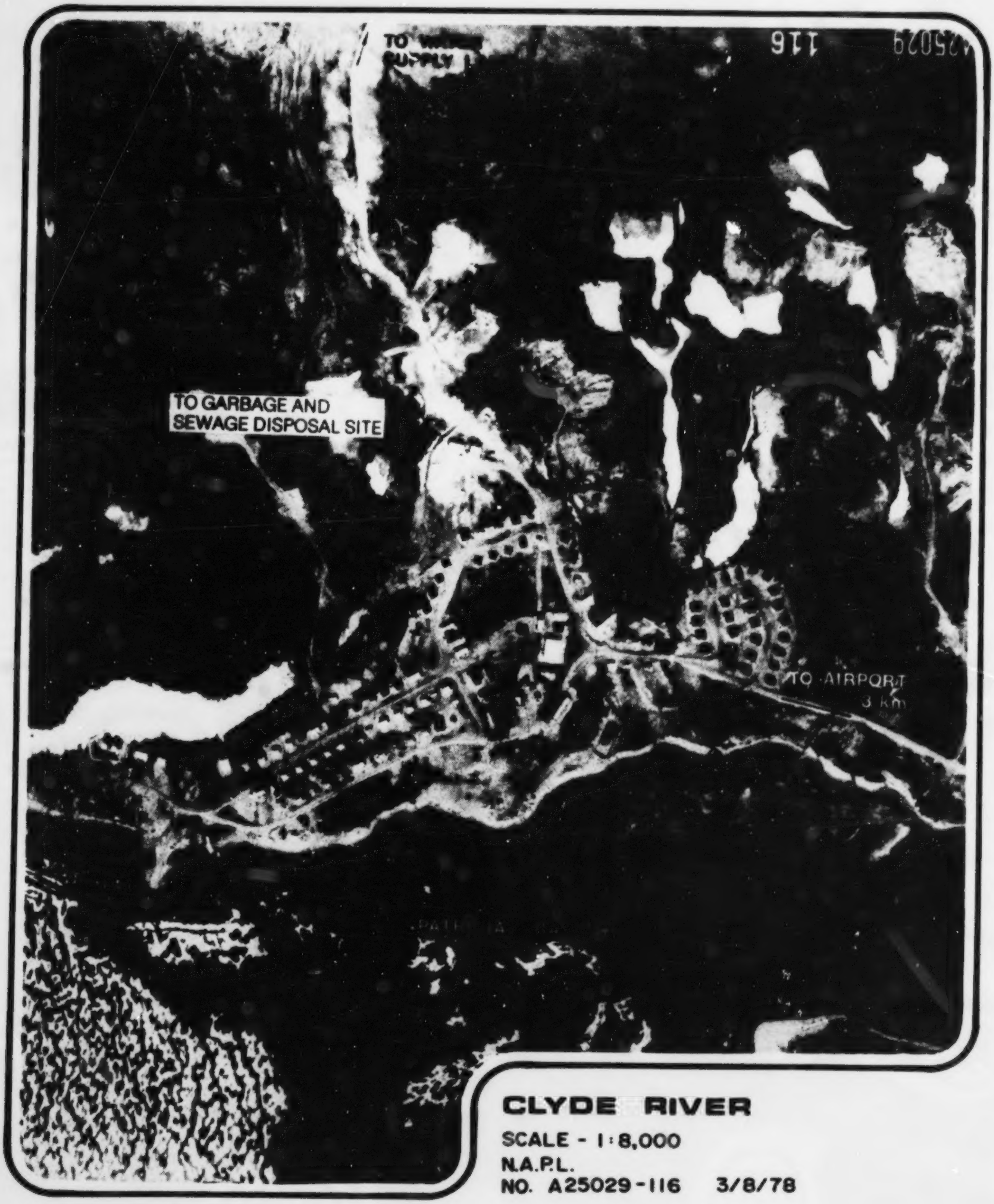
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	6				
Number of Buildings	1				
Persons Per Building	N/A				
Water - Service	T				
- Use (L/d)	547.8(b)				
- Container (L)	U				
Sewage - Service	HB				
- Production (L/d)	U				
- Container (L)	30				
Garbage - Production (m^3/d)	U				
- Container (m^3)	0.2				

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

6. Hotel

Clyde River



CLYDE RIVER

SCALE - 1:8,000
N.A.P.L.
NO. A25029-116 3/8/78

CLYDE RIVER

A. GENERAL

A.1 Location

Clyde River is located on Patricia Bay on the east Coast of Baffin Island, approximately 740 km north of Frobisher Bay. Its geographical co-ordinates are 70°27'N and 68°33'W.

A.2 History

The original settlement was established in 1922 when the Hudson's Bay Company constructed a trading post across the bay. It was moved to its present site during 1967-70. During World War II, Clyde River began to expand with the erection of the weather and navigational aid station. Native peoples constitute about 93% of the total population.

A.3 Community Information

Clyde River achieved Hamlet status on July 1, 1978. Between 1978 and 1981 the population increased from 411 to 443. The economy of the community depends mainly upon trapping and the production of carvings.

The dimensions of the gravel landing strip are 1070 m x 30 m and it is located at an elevation of 61 m ASL. The unlicenced strip is located 3.2 km east of the community.

A.4 Geology and Terrain

Clyde River is situated on a south-facing slope that gradually rises to 152 m ASL. The townsite itself occupies a shallow gravel ridge 3 m to 9 m above high tide and lies 150 m to 300 m from the above.

The bedrock is precambrian crystalline shield mantled with a thin veneer of glacial till. In earlier geological times, the land was submerged to a 50 m to 60 m depth and, as a consequence, there are lacustrine deposits of unconsolidated sands and gravel.

Permafrost is found at a very shallow depth which contributes to some drainage problems.

A.5 Vegetation

The vegetation is typical arctic tundra. With the short summers the most common types of vegetation are mosses and lichens.

A.6 Climate

The July high and low are 8.8°C and 0.8°C. The January mean high and low temperatures are -23.1°C and -30°C respectively. The Hamlet receives an average of 205 mm of precipitation yearly. The rainfall portion is 59 mm and snowfall accounts for 146 mm.

The weather is often clear, but week long periods of fog in the summer and blizzards in the winter are common, often preventing aircraft from landing. The prevailing winds are northwesterly at 10 km/h.

B. MUNICIPAL SERVICES

B.1 Water Supply

The year-round source of potable water Water Lake is situated 1.0 km inland from the settlement, at an elevation of 125 m to 150 m. The lake is fed from a series of lakes and streams further inland.

The water is clear, soft and low in dissolved salts. It is slightly corrosive and has a low chlorine demand.

A chemical analysis for the Clyde River Water Supply Lake is as follows: (All values in mg/L unless otherwise noted)

Parameters	Values
pH	6.80
Total Hardness (as $CaCo_3$)	5.4
Total Alkalinity (as $CaCo_3$)	9.8
Calcium (as Ca)	10.0
Apparent Colour (HZU)	7.1
Turbidity (FTU)	2.6
Chloride (as Cl)	2.2
Sulphate (as SO_4)	2.0
Total Iron (as Fe)	0.02
Manganese (as Mn)	0.004

(Sample taken March 22, 1983 for Environmental Health Officer, Health and Welfare Canada.)

A hose placed on the lake bottom is used for drawing water directly into the water delivery truck. The water is chlorinated by the addition of bleach directly to the truck tank at the rate of 18 mL/1000 L (3 oz./1000 Igal) of water.

B.2 Water Distribution

B.2.1 Trucked System

Water delivery is provided by the Hamlet of Clyde River with a 4540 L (1000 Igal) capacity water delivery truck. Each home receives water approximately 2-3 times per week.

B.3 Sewage Collection

B.3.1 Sewage Pumpout and Truck Pick-up

Sewage pumpout is collected by the Hamlet using a 4540 L (1000 Igal) capacity sewage pumpout truck. Service is provided every day for the 66 homes with pressure water systems.

Bagged sewage is collected along with the solid waste in a four-wheel drive stake truck. The truck is equipped with two 204 L (45 Igal) drums in which the honeybags are placed.

8.4 Sewage Disposal

The disposal site is 1.0 km west of the settlement. It is located on one side of a small valley through which a stream occasionally flows.

8.5 Solid Waste

Garbage is stored outside in 204 L (45 Igal) used oil barrels outside the homes. It is collected along with the bagged sewage and disposed of at the same location as the sewage. Burning occurs approximately once a month.

8.6 Roads

There is a considerable quantity of granular material along the bank of the river which is used for road upgrading and construction as required.

8.7 Surface Drainage

Drainage is generally poor due to the impervious nature of the soils. The discharge of wash water presents a problem since it forms puddles in the summer and ice mounds in winter. This causes some public health concerns.

8.8 Fire Protection

There is no organized fire alarm system in Clyde River. The fire facilities consist of 8 volunteers, a 159 kg dry chemical extinguisher, and a 49 L/s standard triple combination pumper.

8.9 Other Services

- Telephone - Bell Canada radio telephone
- C.B.C. radio and television
- Contains a nursing station with two nurses
- Two RCMP Constables
- Power is supplied by NCPC and generated by diesel engines

SOURCES OF INFORMATION

1. Jack Grainge, Report of Water Supplies and Wastes Disposal, Clyde River, N.W.T., November, 1976.

2. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

3. Jaypoody, Daniel, Secretary Manager, Hamlet of Clyde River, Personal Communication, June 1983.

4. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Clyde River.

1. GENERAL INFORMATION

Name: Clyde River
Region: Baffin

Classification Hamlet
Code Number 701

Northern Community Index: 1.75
Annual Growth Rate (%) 2.9

Community Population:

Total: 443
Year: 1981

Piped: 0
Year: 1983

2. WATER INTAKE/SOURCE

Name: Water Supply Lake

Type: Lake

3. WATER TREATMENT

Type: Addition of Bleach

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 1.0

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	12.96	13.05	13.04	13.04
Number of Helpers	1	1	1	1
Helpers Wages $/hr	12.20	---	10.40	10.40

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.54

Vehicle Freight Rate ($/kg): 1.11

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 1.0

Garbage Disposal Distance (km): 1.0

Honeybag Disposal Distance (km): 1.0

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: Land

15. GARBAGE TREATMENT

Type: Burning

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

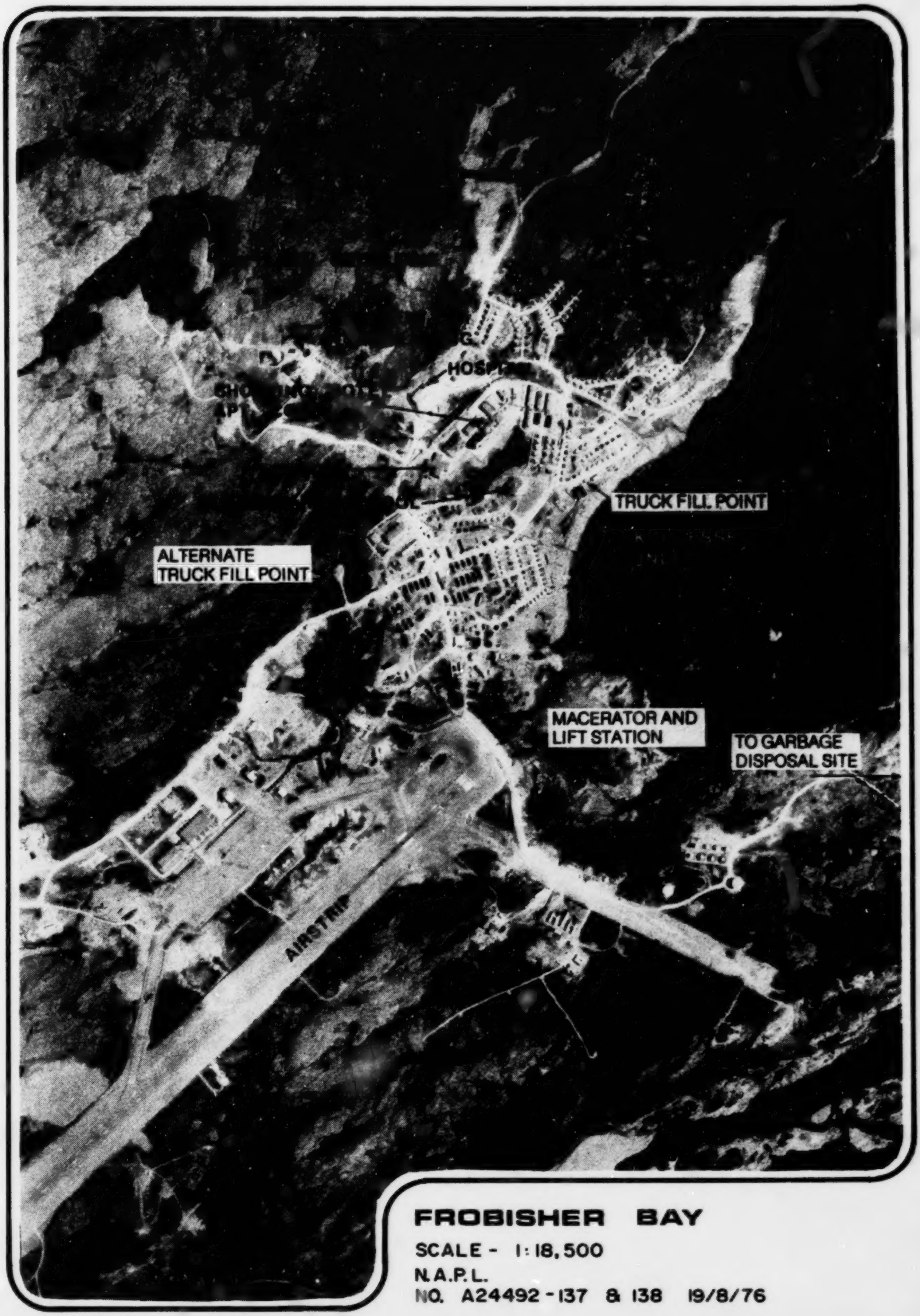
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3		
Number of Buildings	66	25	1		
Persons Per Building	4.9(E)	4.9(E)	161		
Water - Service	T	T	T		
- Use (L/d)	U	U	U		
- Container (L)	1135(A)	204(A)	U		
Sewage - Service	PO	HB	PO		
- Production (L/d)	U	U	U		
- Container (L)	1135(A)	30	U		
Garbage - Production (m^3/d)	U	U	U		
- Container (m^3)	0.2	0.2	0.2		

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure systems.
2. Residential without pressure systems.
3. School.

Frobisher Bay



FROBISHER BAY

SCALE - 1: 18,500
N.A.P.L.
NO. A24492 - 137 & 138 19/8/76

FROBISHER BAY

A. GENERAL

A.1 Location

Frobisher Bay, the largest community in the Baffin Region, is located at the south end of Baffin Island, about 2060 km north of Montreal and 2275 km east of Yellowknife. The geographical co-ordinates are 64°44'N latitude and 68°31'W longitude.

A.2 History

Sir Martin Frobisher sailed into Frobisher Bay in 1576 in search of a Northwest Passage. The present community is near the site of a traditional Inuit fishing camp called Iquluit. A U.S.A.F. base was established in 1942 and turned over to the Royal Canadian Air Force in 1946-1950, but significant growth did not occur in the area until DEW Line construction commenced in 1955.

A.3 Community Information

Frobisher achieved Town status on October 1, 1980. The economy is based on government institutions and services though private facilities are increasing in numbers. Primary, secondary, and adult education are available. Various social institutions, a general hospital, stores, a Legion, three hotels and crafts centre provide services in a quantity not found anywhere else in the Arctic east of Inuvik. The Town enjoys recreational facilities such as an arena, library, swimming pool, youth centre, and parks.

The Town population in 1981 was 2333 of which approximately 67% are Inuit. The number of people has remained stable over the past few years.

Access is by sea or by air. Freight is shipped from Montreal from July to September. The asphalt airstrip is 2743 m by 61 m at 33.5 m ASL. Frobisher Bay receives five flights weekly from Resolute and Montreal as well as two flights from Yellowknife weekly.

A.4 Geology and Terrain

A rolling terrain surrounds the community. The subsoil is made up of glacial drift over a granitic Precambrian bedrock. The overburden, silty sand, sand, gravel, and boulders, varies from 0 m to 18 m thick.

The depth of thaw of the permafrost ranges from 1 m to 1.8 m. The water table is very high and segregated ice lenses may be found.

A.5 Vegetation

Vegetal cover is limited on Baffin Island. Lichens, mosses and hardy flowers and grasses flourish in the summer months.

A.6 Climate

Frobisher Bay experiences 8 months of the year in which the average daily temperature is below freezing. The warmest month, July, has an average daily temperature of 7.9°C. January has an average daily temperature of -26.2°C. The mean annual rainfall is 18 cm and the mean annual snowfall is 246.9 cm. The average windspeed is about 15 km per hour.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 Source

Lake Geraldine is the source of the Town's water (see aerial photo). It is at an elevation which permits gravity feed to the water treatment plant. The maximum volume of the lake is 2020 million L.

The treated water is clear, soft and low in dissolved minerals. An analysis of the water is as follows:

Parameters	Values
pH	7.3
Total Hardness (as $CaCO_3$)	27
Total Alkalinity (as $CaCO_3$)	26
Calcium (as Ca)	8
Chloride (as Cl)	5
Sulphate (as SO_4)	Trace
Nitrate (as NO_3)	0.1
Total Iron (as Fe)	0.1

(Sample taken for Health and Welfare Canada, on May 27, 1976.)

B.1.2 Intake Facilites

The intake is 5.4 m below the crest of a dam at the lake outlet. Water flows to the treatment plant through 213 m of 250 mm diameter steel pipe. Heated water is continously circulated through the intake line to prevent freezing. The incoming raw water is thus maintained at a minimum of 10°C.

B.1.3 Treatment

The water treatment plant was finished in 1963. It was built with provisions for chlorination, flocculation and settling, fluoridation, lime treatment and ozonation. Ozonation, flocculation and settling have been discontinued.

The mixing chamber is 3.81 m x 1.22 m x 5.03 m deep with six over and under baffles. The two rapid sand filters have a combined area of 9.10 m^2. The flow rate is approximately 100 $L/m^2/min$. The filters are backwashed at a 1.8 m loss of head or a maximum time lapse of 48 hours.

The plant at full capacity is capable of treating 1.8 million L (400,000 Igal) every 24 hours; currently, however, only daytime operation is necessary to supply the town.

B.1.4 Storage

The storage reservoirs on the first floor of the treatment building have a total combined capacity of 633,950 L (139,450 Igal).

B.1.5 Pumping Facilities

There are two circulation pumps in the treatment building with these specifications:

1. Function: Circulate heated water through intake line
   Model: Bell & Cosset 1BDR
   Motor: CGE Model 111573 1/4 HP, 3 phase/575 V/60 Hz, 1725 RPM

2. Function: same as above
   Model: Armstrong H41546
   Motor: 1/4 HP, 3 phase/575 V/60 Hz, 1725 RPM

The fire pump has the following specifications:

Model: Darling 75771LH
Motor: Tamper 356US-DB5, 3-phase/575 V/60 Hz, 1772 RPM

Pressure in the distribution is maintained by the natural head available at water flows by gravity from the treatment plant through the storage facilities. The pressure gradient throughout the Town ranges from 690 to 965 kPa (100 to 140 psi).

B.2 Water Distribution

B.2.1 Piped System

The original utilidors, built during the early 1960's, serviced only the hospital, a central complex, the Federal Building, and some residences. Portions of these corrugated metal utilidors remain.

Construction commenced in 1976 on a multi-phase project to expand the piped water and sewage system. Two new buried loops service the east and central portion of town.

A 250 mm ductile iron water main, with a 25 mm return encased in an insulated above ground metal box, runs between the hospital, high school, and hotel-apartment-shopping complex. A double 50 mm supply and 20 mm return line still serves the G.N.W.T. staff houses.

Part of one of the new buried looped water mains is 200 mm diameter pipe but generally all recently installed water mains are 150 mm with 37 mm return lines.

In Phases I and II, class 3 insulated ductile iron pipe was installed. Victaulic joints were used in Phase I and Tyton joints were used in Phase II. A 19 mm electrical metallic tubing (EMT) was placed on top of the pipe for the heat trace cable. The pipe and tubing were insulated with 75 mm of polyurethane foam and wrapped in a high density polyethylene jacket.

Series 160 Sclaircor polyethylene pipe was utilized in Phases III and IV of the project. A 25 mm polyethylene thaw tube was installed instead of heat trace. Both pipes are covered with 50 mm of rigid polyethylene foam and a 1.15 mm thick jacket.

A heat trace cable providing 8.2 watts per lineal metre @ 115 V was applied to 50 mm and 100 mm pipe. A cable supplying 16.4 watts per lineal metre @ 115 V was laid on 150 mm, 200 mm and 250 mm pipe. Temperatures are controlled by thermostats in the service manholes.

The Phase I and II water mains and sewer lines are shallow buried and supported on 250 mm x 300 mm timber beams 2400 mm long and spaced at 2.4 m center to center. The ends of the beams are anchored in permafrost and are expected to prevent the pipes from sagging upon local thawing. Phase III and IV piping is supported by granular bedding.

Valves were installed at regular intervals to prevent isolation of relatively small pipe sections in the event of a break or leak. There are facilities to completely drain the system in an emergency.

The manholes used in Phase I and II are precast concrete and contain either or both the sewer and water mains, electrical equipment for heat tracing, and heaters for heating the manholes. Hydrants are at a maximum spacing of 150 m and some are in manholes.

8.2.2 Service Connections

Boxes of 50 mm thick polyurethane 60 cm, covered with 12 mm plywood encase the service connections. Upon hook-up the boxes were filled with polyurethane foam. The Phase I and II copper supply and return water lines are 12 mm or 15 mm in diameter. In Phase III 2-20 mm water lines and a heat trace cable were threaded through a 75 mm polyethylene duct. The domestic circulating pumps are 19 mm Armstrong Model S25 pumps with electric motor, and are designed to run continuously.

8.2.3 Recirculating Pumphouse

The heating and re-circulating building was built in 1979 between the high school and the hospital. It houses two re-circulating pumps and a hot water converter. Hot water from the N.C.P.C. generating plant heats domestic water in the converter. This water is then injected into the northern loop and unused amounts are re-circulated through the converter. The two Armstrong S-35 pumps have capacities of 1.26 L/s @ 660 kPa.

8.2.4 Trucked System

Approximately one-third of the population is still serviced by a trucked water system. The community is presently in a period of conversion to a piped system, although Apex will remain on completely trucked system. The municipality has contracted out the water delivery service in the past, but will be taking over the services themselves on October 1, 1983. The service contract was held by Okota and Paton Limited, who operated four 7264 L (1600 Igal) capacity water tank trucks. The municipality will be using two trucks with 17252 L (3800 Igal) and 10442 L (2300 Igal) capacity water tanks when they take over the service.

B.3 Sewage Collection

B.3.1 Piped System

The gravity sewer system was expanded during a 5 year period. In the first two construction phases a class 2 ductile iron pipe with cement lining and Tyton joints was laid. A length of 19 mm diameter metallic tubing on top of the pipe contains a heat trace cable. Insulation consists of 75 mm of polyurethane foam covered by a 1.12 mm (HDPE) jacket. The arrangment is supported on the same timber beams as the water main.

For Phases III and IV 100 mm Series 45 Sclaircor HDPE pipe was used. It is not heat traced but is insulated with 50 mm of rigid polyurethane foam and wrapped in a 1.15 mm HDPE jacket. These pipes are simply supported by the granular bedding. The sanitary sewer mains are equipped with a prefabricated clean-out.

B.3.2 Service Connections

Phase I and II sewer service connections are of 100 mm ductile iron heat traced pipe. Phase III and IV connections utilize Series 45 HDPE heat traced pipe in a bundle with the water supply and return lines. The mains and service line connections are enclosed in an insulated plywood box.

B.3.3(a) Sewage Lift Station No. 1

The main (1976) lift station is located at the western end of the gravity collection system. It collects all sewage and discharges it through a 200 mm forcemain towards a macerator building.

The pumphouse contains a wet well and two sewage pumps with the following specifications.

Type:	self-priming centrifugal
Model:	Gorman Rupp Company Model T6A3-B
Capacity:	44.2 L/s @ 174 kPa (580 Igpm @ 58' TDH)
Motor:	Crompton Parkinson 25 HP, 1800 RPM, 3/60/575

There is no standby power supply or pump in case of pump failure. The wetwell is equipped with an emergency overflow which discharges to the ocean through a 250 mm pipe.

B.3.3(b) Sewage Lift Station No. 2

The second lift station, finished in 1977, collects sewage from the southern section of the Town. Waste is pumped through a 150 mm forcemain to a manhole and flows from there to Lift Station #1 by gravity.

The station is composed of a wetwell and an underground pump room with these two pumps:

Type:	Self-priming centrifugal pumps
Model:	Gorman Rupp T-3A3-B
Capacity:	13.9 L/s @ 114 kPa (185 Igpm @ 38' TDH)
Motor:	Leroy Somer, 7.5 HP, 3/60/575 V, 1750 RPM

There is no standby power supply for this station. It is equipped with a 200 mm overflow pipe which allows sewage from the wetwell to flow into the sea in the event of a lift station failure.

B.3.4 Macerator and Outfall

The macerator and outfall were built to replace 5 outfalls along the shore of Frobisher Bay. It was discovered the macerator will not process bagged waste. As there are insufficient solids in the piped sewage to necessitate maceration, currently all sewage flows from the 300 mm inflow pipe through a bypass and outfall to a sewage holding pond on the seashore.

The macerator unit (Chittenden-Howard Type F5019) and hopper are contained inside a buried concrete unit. Trucked sewage is dumped into the sewage main upstream. The macerator was intended to accept bagged sewage, but vortexing problems have occured in the hopper using bags. The future of the macerator is currently under review.

The retention pond has the capacity to store one winter's production of sewage. After thawing, waste is released over land to the sea.

B.3.5 Sewage Pumpout and Truck Pick-up

Bagged sewage is collected from about 50 units at least 3 times weekly. The municipality provides bagged sewage collection with a 4-wheel drive pick-up truck. Sewage pumpout service has been provided in the past by Okota and Paton Ltd. with three 7264 (1600 Igal) sewage vacuum trucks. On October 1, the municipality will take over the service using a 15436 L (3400 Igal) and a 9988 L (2200 Igal) vacuum sewage trucks. Approximately 121 homes are serviced by pumpout sewage.

B.4 Bagged Sewage Disposal

Bagged waste is dumped at the landfill site beside the domestic garbage.

The liquid sewage is disposed of at the sewage dumping station located near outfall line to the sewage holding area.

B.5 Solid Waste Collection and Disposal

Solid waste was hauled by compactor trucks and open trucks to the dump until the winter of 1979. This waste combined with bagged sewage was hauled to a site beside Apex, a collection of homes south of the Town. This was undesirable due to the proximity to homes. A new site on rocky ground in the West 40 has been chosen. The garbage thus cannot be covered with soil but may be burned periodically.

B.6 Roads and Surface Drainage

The base of the roads is composed of gravel, which is in abundant supply. A dust problem was partially alleviated in recent years by paving of the main roads.

B.7 Fire Protection

Fire protection in Frobisher Bay consists of:

- a volunteer 40 person brigade and a volunteer Fire Chief;
- a hydrant system;
- an alarm system and pagers; and
- three triple standard pumpers.

B.8 Other Services

Frobisher Bay has a weekly newspaper, a radio station, telephone and telex service, television, and mail delivery five times per week. A bank, taxi service, and hotel are added conveniences. NCPC operates the power generating facilities which have a combined capacity of 11,300 kW.

SOURCES OF INFORMATION

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8. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

9. Andres, Reginald J., Dussault, John J.A., Elkin, Brett T., Community Planning and Development Division, Department of Local Government, Government of the N.W.T., Site Visit, June 1983.

1. GENERAL INFORMATION

Name: Frobisher Bay

Region: Baffin

Classification Town

Code Number 800

Northern Community Index: 1.58

Annual Growth Rate (%) 3.4

Community Population:

Total: 2333 Year: 1981

Piped: 1470 Year: 1983

2. WATER INTAKE/SOURCE

Name: Lake Geraldine

Type: Lake

3. WATER TREATMENT

Type: Chlorination, Fluoridation, lime treatment

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 1.7

Trucked(km): 0.5

6. COMMUNITY WATER STORAGE

Capacity (L): 633,950

7. WATER DISTRIBUTION PUMPHOUSE

Type: Yes

8. TRUCK FILL POINT

Type: Yes

9. PIPED DISTRIBUTION AND COLLECTION

Type: Looped water mains
Gravity sewage lines

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	17252 L 10442 L	15436 L 9988 L	$5.2\ m^3$	$5.2\ m^3$
Drivers Wages $/hr				
Number of Helpers	U	U	U	U
Helpers Wages $/hr				

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.57 Vehicle Freight Rate ($/kg): 0.77

11. LIFT STATION

Type: Yes

2. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): 2.0
Trucked(km): 1.6

Garbage Disposal Distance (km): 3.6 honeybag Disposal Distance (km): 3.6

13. SEWAGE TREATMENT

Type: holding Pond

14. SEWAGE DISPOSAL

Name: Frobisher Bay
Type: Ocean

15. GARBAGE TREATMENT

Type: Burning

16. GARBAGE DISPOSAL

Type: Land

17. hONEYBAG TREATMENT

Type: None

18. hONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	294	121	50	U	U
Persons Per Building	5.0(E)	5.0(E)	5.0(E)	N/A	N/A
Water - Service	P	T	T	P	T
- Use (L/d)	U	166.7(a)	59.8(a)	U	U
- Container (L)	N/A	1135(A)	204(A)	N/A	U
Sewage - Service	P	PO	hB	P	PO
- Production (L/d)	U	166.7(a)	U	U	U
- Container (L)	N/A	U	30	N/A	U
Garbage - Production (m^3/d)	U	U	U	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with piped systems.
2. Residential with pressure systems.
3. Residential without pressure systems.
4. Nonresidential with piped systems.
5. Nonresidential with pressure systems.

NOTES:

(a) Obtained from April 1983 water delivery records.

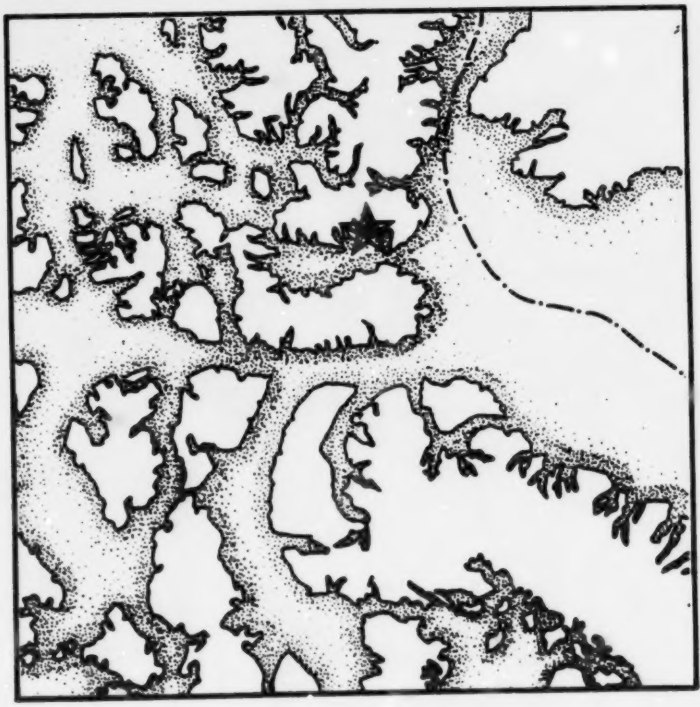
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	6				
Number of Buildings	2				
Persons Per Building	729				
Water - Service - Use (L/d) - Container (L)	P U N/A				
Sewage - Service - Production (L/d) - Container (L)	P U N/A				
Garbage - Production (m^3/d) - Container (m^3)	U 0.2				

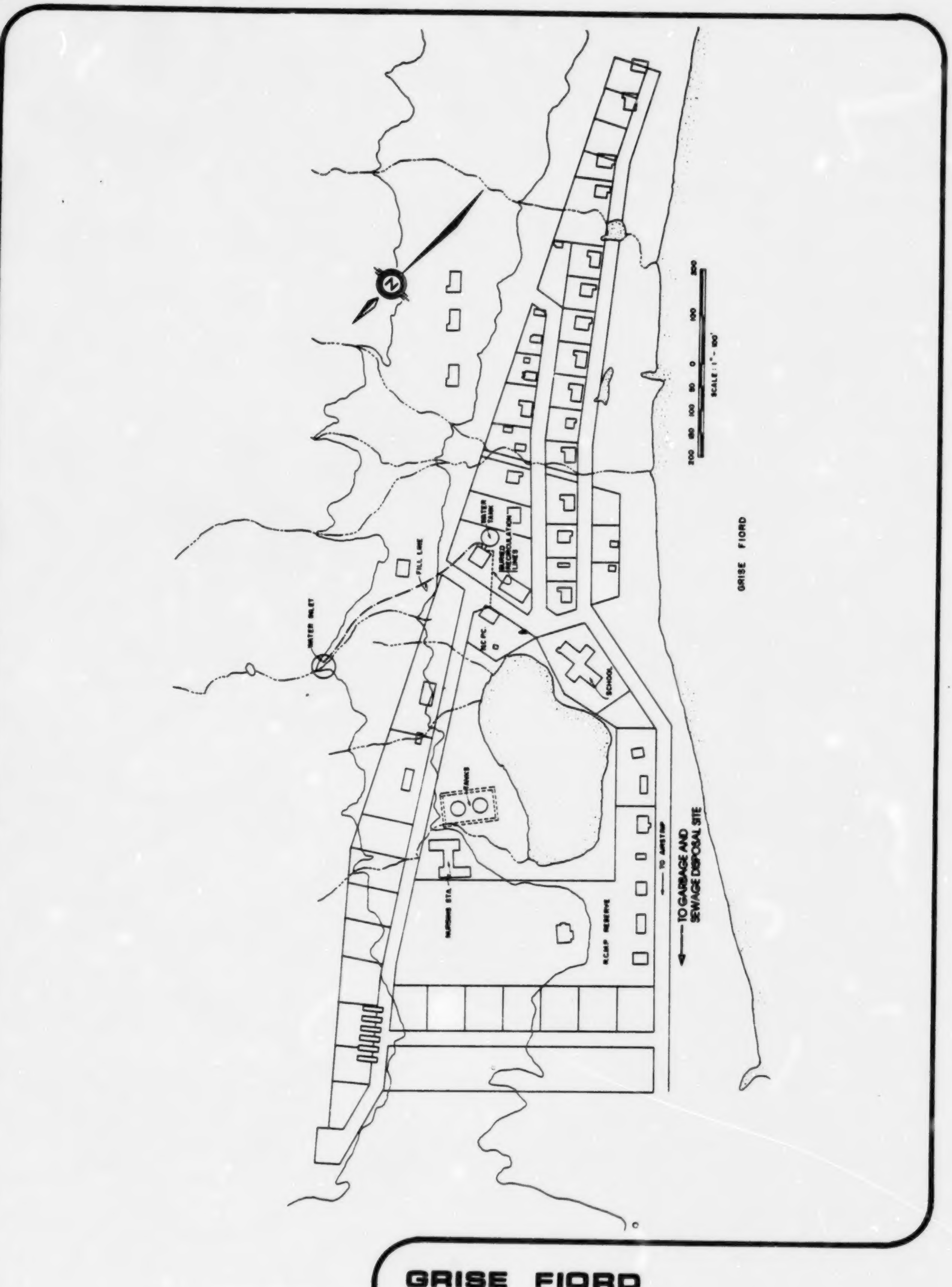
CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

6. School

Grise Fiord





GRISE FIORD

SCALE -
N.A.P.L.
NO.

56

GRISE FIORD

A. GENERAL

A.1 Location

Grise Fiord is located at a latitude of 76°25'N and a longitude of 83°01'W on the southern coast of Ellesmere Island. It is approximately 380 km northeast of Resolute and 1920 air km northeast of Yellowknife.

A.2 History

Grise Fiord was established when the R.C.M.P. and the Eskimos relocated there in the early 1960's from Craig Harbour, 50 km to the east. There are Thule ruins close to the settlement and evidence of the explorers of the late 1800's and early 1900's can be found. This is Canada's most northerly Inuit community.

A.3 Community Information

Grise Fiord, which means 'Pig Fiord' in Norwegian, is classified as a Settlement. Between the years 1978 and 1981 the population varied only from 99 to 106. The population is expected to be fairly stable at around 100 people.

The economy of Grise Fiord is primarily based on hunting, trapping, fishing and some handicrafts. Services include a nursing station, primary school (grades K-8), a hotel and two R.C.M.P. constables.

The settlement has a 610 m x 24 m gravel airstrip at an elevation of 38 m ASL.

A.4 Geology and Terrain

The Settlement is situated on a narrow strip of beach near the mouth of Grise Fiord. From the beach the land slopes back in a series of low benches for a few hundred feet to the face of a steep rock face. The surficial soils in the area consist of free draining gravel deposits. A major layer of silty sand with traces of gravel was identified over a large portion of the valley above the Settlement. The depth of the permafrost table is about 0.6 m.

A.5 Vegetation

Grise Fiord is located in the Arctic Tundra. The vegetation consists of mosses and lichens.

A.6 Climate

The temperature in Grise Fiord ranges from a mean high and low in July of 10°C and 2.2°C to a high and low of -27.2°C and -35°C in January. Precipitation consists of 152.4 mm of snow and a trace of rain. The prevailing winds are southeast at 18 km/h.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

Before the existing water supply came into use the community used a glacial stream flowing from the nearby hills as a summer source. A half round section of corrugated culvert pipe was placed in the stream bed to form a makeshift dam.

During the winter, ice was hauled from icebergs in the sea. It was delivered to homes and melted in water holding tanks. This method involved a large amount of handling and resulted in high potential for contamination.

A Raypack reverse osmosis machine for the desalinization of sea water was experimentally tried in Grise Fiord. The experiment was not very successful. The process proved to be complicated, expensive and unreliable.

B.1.2 Source

The present source of the settlement's water supply is a glacial stream that flows from the hills behind the community during the summer months. The water is clear, soft, contains negligible amounts of dissolved salts, and is slightly high in iron content.

Following is a typical chemical analysis of the water. (All values in mg/L unless otherwise noted)

Parameters	Values
ph	8.00
Total hardness (as $CaCO_3$)	48.8
Total Alkalinity (as $CaCO_3$)	52.4
Apparent Colour (hU)	4.8
Turbidity (FTU)	0.40
Calcium (as Ca)	13.6
Chloride (as Cl)	2.0
Sulphate (as SO_4)	2.0
Nitrate (as NO_3)	---
Total Iron (as Fe)	0.6
Manganese (as Mn)	0.003

(Sample taken March 3, 1983 For Environmental health Officer, health & Welfare Canada, from water truck.)

B.1.3 Intake Facilities

In the summer water is pumped from the glacial stream. A half round section of corrugated metal pipe is placed in the stream bed to form a makeshift dam. A tank to store the winter's water supply is filled by a hose running from the dam to the top of the tank. The head difference is 3.5 m, allowing flow by gravity. In the summer the water truck is filled directly from the stream.

B.1.4 Treatment

The only treatment required is chlorination at this time. It consists of a Wallace and Teirnan 94 series hypochlorinator system.

The chlorinator is located in the walkway between the storage tank and the truck garage.

B.1.5 Storage

The storage tank in Grise Fiord was designed to provide the community with water through the winter season (approximately 9 1/2 months storage). The tank's specifications are as follows:

Capacity: 1.4×10^6 L (310,000 Igal)
Diameter: 13 m
height: 11 m
Material: welded steel plate API standard 650
Insulation: 64 mm urethane foam max.

B.1.6 Pumping Facilities

Three identical pumps are used. Two are used for cold water circulation and one is for hot water circulation for protection against freezing. Pump specifications are as follows:

Type and Model: PACO, Model 1570-5 vertical inline, single stage, cast iron body, bronze fitted, centrifugal pump.
Capacity: 3 L/s @ 60 kPa (40 Igpm @ TDh 20')
Motor: 1/2 hP, 1750 RPM, 115 V/1/60 hz, drip proof

B.2 Water Distribution

The Settlement of Grise Fiord uses a trucked system to distribute water in the community.

Water delivery is contracted to the Settlement Council.

A wheeled truck with a capacity of 4540 L (1000 Igal) is filled inside the garage located beside the storage tank. Deliveries are made five days a week to fill the 227 L (50 Igal) tanks in the residences.

B.3 Sewage Collection

All of the sewage in Grise Fiord is collected by means of bagged sewage pick-up.

Sewage pick-up is handled by the Settlement Council. The bags are placed in 204 L (45 Igal) drums outside homes for pick-up 4-5 times per week. A dump truck is used to collect bagged sewage and garbage simultaneously.

B.4 Sewage Disposal

Bagged sewage is discarded over the edge of a 2 m high embankment in a small area 1.5 km east of the Settlement. Wash water from the nursing station is discharged into a nearby pond. Wash water from the school is contained in a holding tank and is occasionally drained. It flows across the road to the sea. Residents discharge their wash water on the ground beside their homes.

B.5 Solid Waste

Solid wastes are collected along with the bagged sewage by the Settlement Council. Refuse is burned outside homes in 204 L (45 Igal) drums and disposed of in the same place as the bagged sewage.

B.6 Roads

The roads in Grise Fiord are subject to use only by a few trucks and tracked vehicles. There is an ample supply of suitable gravel in Grise Fiord. Annual road construction and upgrading is carried out.

B.7 Surface Drainage

Since the community is situated on a gravel beach, there are no serious drainage problems.

B.8 Fire Protection

Fire protection in Grise Fiord consists of eight volunteers and a 159 kg (350 lb) dry chemical extinguisher. This is the minimum for northern communities.

B.9 Other Services

Bell Canada provides radio-telephone service via the Anik satellite. Mail service is bi-monthly. There is no radio or television in the community presently, but is planned in the near future. NCPC provides for the power requirements using 3 diesel generators.

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7. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Grise Fiord.

1. GENERAL INFORMATION

Name: Grise Fiord
Region: Baffin
Classification Settlement
Code Number 706
Northern Community Index: 1.91
Annual Growth Rate (%) 3.0
Community Population:
Total: 106 Year: 1981
Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Glacial Stream
Type: Stream

3. WATER TREATMENT

Type: Chlorination

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None
Trucked(km): 0.5

6. COMMUNITY WATER STORAGE

Capacity (L): 1.4×10^6

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: Yes

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	2270 L	N/A	7.8 m^3	7.8 m^3
Drivers Wages $/hr	9.00	---	9.00	9.00
Number of helpers	1	---	1	1
Helpers Wages $/hr	9.00	---	9.00	9.00

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.54 Vehicle Freight Rate ($/kg): 0.87

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): None

Garbage Disposal Distance (km): 1.5 Honeybag Disposal Distance (km): 1.5

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: None

15. GARBAGE TREATMENT

Type: Burning

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

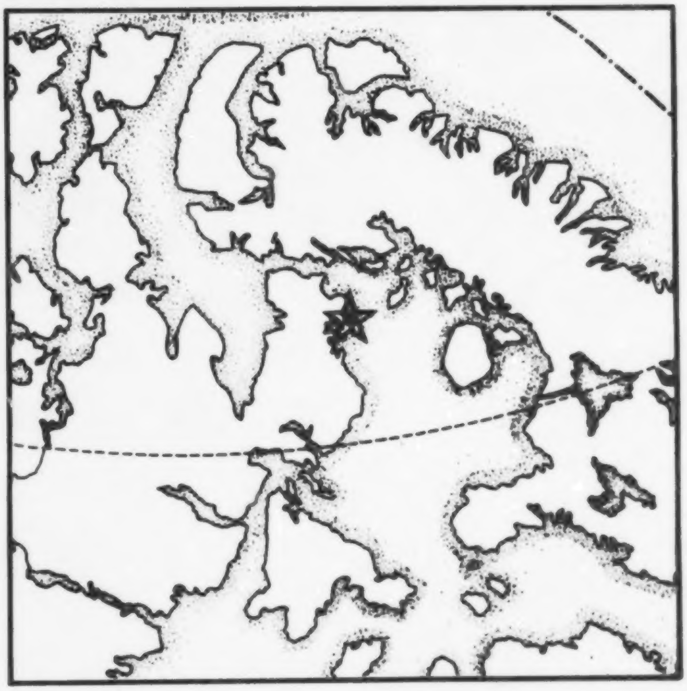
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	
Number of Buildings	23	1	1	1	
Persons Per Building	4.6(E)	29	N/A	N/A	
Water - Service	T	T	T	T	
- Use (L/d)	U	U	U	U	
- Container (L)	227(A)	3859	U	U	
Sewage - Service	HB	HB	HB	HB	
- Production (L/d)	U	U	U	U	
- Container (L)	30	30	30	30	
Garbage - Production (m^3/d)	U	U	U	U	
- Container (m^3)	0.2	0.2	0.2	0.2	

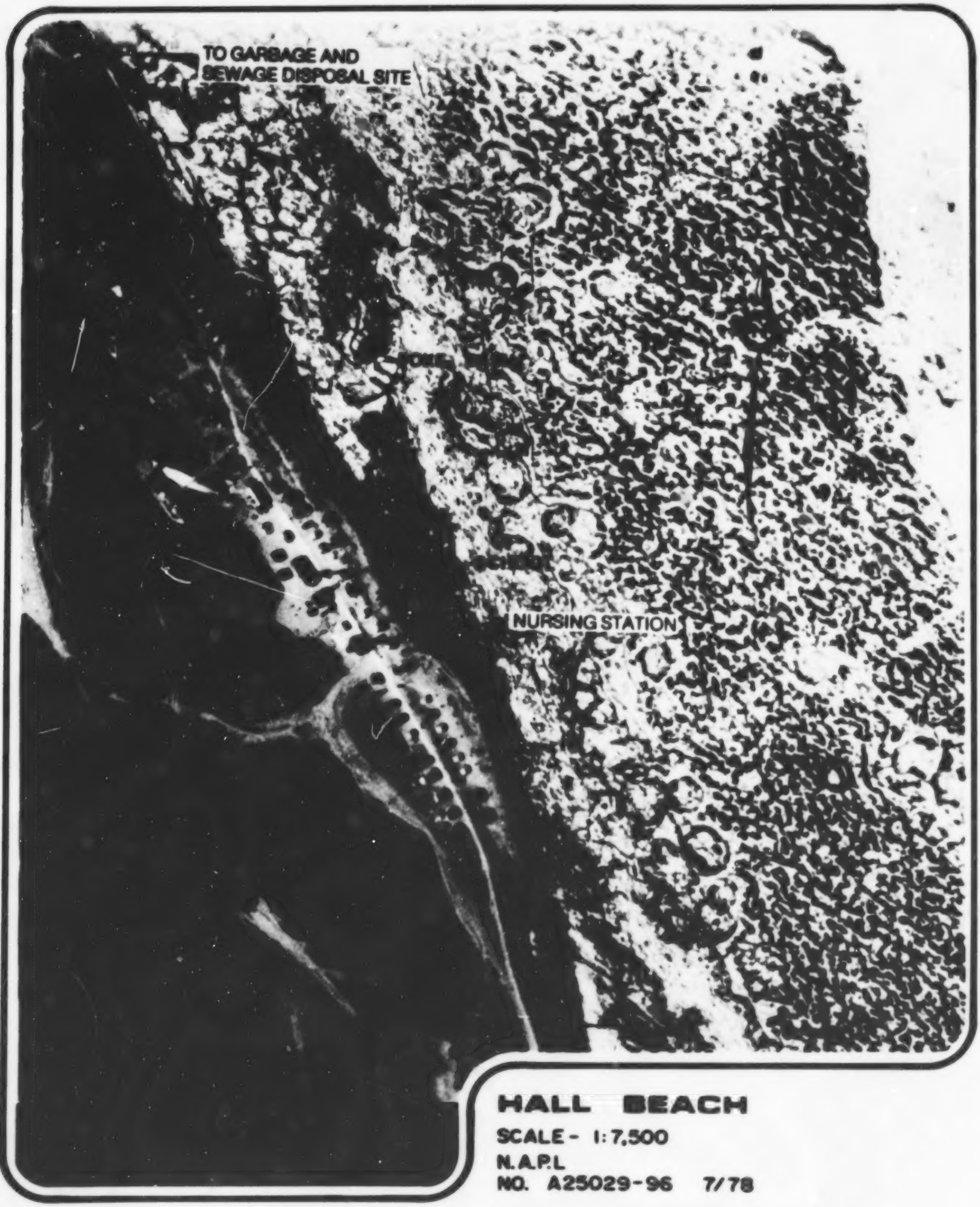
CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential without pressure systems.
2. School.
3. Hotel.
4. Nursing Station.

Hall Beach





HALL BEACH

SCALE - 1: 7,500
N.A.P.L
NO. A25029-96 7/78

HALL BEACH

A. GENERAL

A.1 Location

Hall Beach is located at a latitude of 68°46'N and longitude of 81°12'W in Melville Peninsula. It is 840 km northwest of Frobisher Bay in the Foxe Basin area.

A.2 History

Hall Lake was named after Captain C.F. Hall, an American explorer who spent a number of years on Melville Peninsula in the middle of the last century. The Hall Beach area has been inhabited at various times from the 13th century on.

The present-day site was established in 1953 as a result of the building of a large DEW line site. The community has grown considerably because of immigration from the outcamps.

A.3 Community Information

Hall Beach achieved hamlet status on April 1, 1978. From 1978 to 1980 the population has decreased marginally from 396 to 349.

The economy of Hall Beach is based on employment with the DEW Line, and fur trapping. Services include a school, Roman Catholic Church, and community centre. A 1524 m x 46 m gravel strip at an elevation of 8 m is located 3.2 km south of the hamlet.

A.4 Geology and Terrain

The Townsite stretches approximately 1100 m along the 120 m wide stretch of sand and gravel raised beaches.

A.5 Vegetation

Typical Arctic vegetation such as lichens and mosses are predominant.

A.6 Climate

The July high and low temperatures are 8.5°C and 2.3°C. The January high and low are -27.6°C and -35.7°C. Rainfall of 76.5 mm and snowfall of 1160.8 mm combine to form a total precipitation of 106 mm. The prevailing winds are northwesterly at 21 km/h.

B. MUNICIPAL SERVICES

B.1 Water Supply

The present source of water for the hamlet and Foxe Main DEW Line Station is the DEW Line reservior. It was built in 1956, 1.6 km west of the station and is fed by a diversion from a dam. The approximate capacity is

91,000 m^3. The water in the reservoir and lakes raises during spring run-off. When it is at its maximum, the surrounding dam is shut and this storage is used to supply the users. The water is found to be generally satisfactory for potable use.

Analysis of a water sample is as follows: (all units in mg/L unless otherwise noted)

Parameters	Values
pH	7.70
Total hardness (as $CaCO_3$)	203.5
Total Alkalinity (as $CaCO_3$)	200.0
Apparent Colour (HZU)	6.3
Turbidity (FTU)	0.66
Chloride (as Cl)	25.4
Nitrate (as NO_3)	<0.1
Total Iron (as Fe)	0.08

(Sample taken March 16, 1983 for Environmental Health Officer, Health and Welfare Canada, from DEW line reservoir.)

There is no permanent intake structure. Water is withdrawn by dipping the truck hose into the lake. In the summer, water is taken from the shore, while during the winter a hole is cut in the ice and water is drawn with a hose. The water is treated by the addition of chlorine to the water truck tank. There are no storage or pumping facilities in the community.

8.2 Water Distribution

Water is distributed by a 4540 L (1000 Igal) capacity 1979 truck at this time. A standby 4540 L (1000 Igal) capacity tank on a 1972 vehicle is also available.

Water is delivered five days a week, by the hamlet of Hall Beach. The operator usually makes about ten deliveries per day. Storage tanks in the few homes with pressure water systems have 1135 L (250 Igal) tanks. There are 227 L (50 Igal) containers for storage in 34 of the older homes.

8.3 Sewage Collection

The nursing station, transient centre and school have sewage holding tanks. They are pumped out with a 4540 L (1000 Igal) sewage truck. The rest of the community's waste is collected in the form of bagged sewage. These are collected from outside the home daily by the garbage truck. The truck has a special tank which permits separation of the bagged waste from the garbage.

8.4 Sewage Disposal

The disposal area is located 3.0 km north of the hamlet on the shoreline. Sewage is dumped a bit further north than the solid waste in a ditch and is covered on a seasonal basis.

B.5 Solid Waste

Garbage is collected along with the bagged sewage and is deposited at the dump located 3.0 km north of the hamlet. The garbage is regularly burned and buried. The hamlet provides collection service with a four wheeled drive stake truck.

B.6 Roads & Surface Drainage

The roads receive little usage except for service vehicles and are generally satisfactory. Drainage is positive due to granular nature of soils in Hall Beach.

B.8 Fire Protection

Fire protection in Hall Beach consists of the following:

- 8 man volunteer fire brigade; and
- a 160 kg dry chemical fire extinguisher

B.9 Other Services

- Other services include twice weekly mail delivery.
- NCPC provides power with diesel generator facilities.

SOURCES OF INFORMATION

1. Oliver, Mangione, McCalla & Associates Ltd., Consulting Engineers, Water Supply, Sewage Disposal and Garbage Disposal, Hamlet of Hall Beach, N.W.T. September, 1980.

2. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

3. Hamlet of Hall Beach, Personal Communication, June 1983.

4. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Hall Beach.

1. GENERAL INFORMATION

Name: hall Beach

Region: Baffin

Classification hamlet

Code Number 610

Northern Community Index: 1.76

Annual Growth Rate (%) 3.1

Community Population:

Total: 349 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: DEW Line Reservoir

Type: Lake

3. WATER TREATMENT

Type: None

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 1.6

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	931.74/2 wks	10.21	10.21	10.21
Number of helpers	1	0	1	1
Helpers Wages $/hr	8.17	---	8.17	8.17

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.58

Vehicle Freight Rate ($/kg): 0.89

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 3.0

Garbage Disposal Distance (km): 3.0

Honeybag Disposal Distance (km): 3.0

13. SEWAGE TREATMENT

Type: Holding Pond

14. SEWAGE DISPOSAL

Name: None
Type: Holding Pond

15. GARBAGE TREATMENT

Type: Burning/cover

16. GARBAGE DISPOSAL

Type: Land/Pit

17. HONEYBAG TREATMENT

Type: Holding Pond

18. HONEYBAG DISPOSAL TYPE

Type: Holding Pond

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	32	34	3	U	1
Persons Per Building	5.3(E)	5.3(E)	116(b)	110(b)	N/A
Water - Service	T	T	T	T	T
- Use (L/d)	481.0(c)	241.1(c)	169.9(b)	747 (c)	181.6(c)
- Container (L)	1135(A)	227(A)	6356(b)	U	U
Sewage - Service	PO	hB	PO	PO	PO
- Production (L/d)	231.3(c)	37.6(c)	169.9(b)	747 (c)	181.6(c)
- Container (L)	1135(A)	30	U	U	U
Garbage - Production (m^3/d)	0.07(c)	0.07(c)	0.24(c)	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure systems.
2. Residential without pressure systems.
3. School.
4. D.E.W. Line Station.
5. Nursing Station.

NOTES:

(a) A seperate dump site is used.
(b) Combined total for all buildings in the category.
(c) Based on Sewage and Solid Waste Inventory Report, Hall Beach. (see Sources of Information)

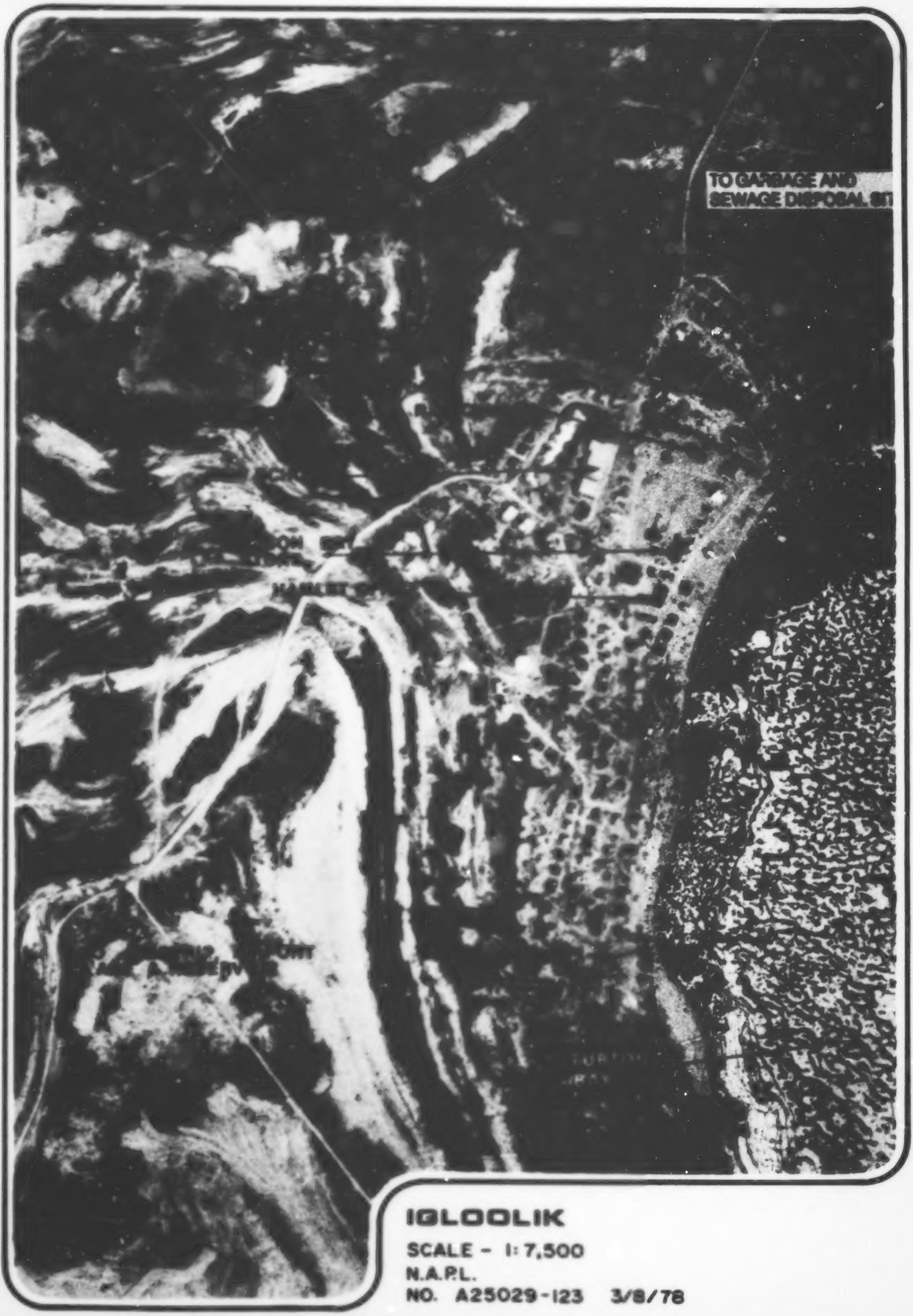
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	6				
Number of Buildings	1				
Persons Per Building	N/A				
Water - Service	T				
- Use (L/d)	U				
- Container (L)	1135				
Sewage - Service	PO				
- Production (L/d)	U				
- Container (L)	U				
Garbage - Production (m^3/d)	U				
- Container (m^3)	0.2				

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

6. Transient Centre

Igloolik



IGLOOLIK

SCALE - 1: 7,500
N.A.P.L.
NO. A25029-123 3/8/78

IGLOOLIK

A. GENERAL

A.1 Location

Igloolik is situated on Igloolik Island at 69°22'N latitude and 81°46'W longitude. The island is located in the Foxe Basin Lowlands. It is bounded in the north by the Fury and Hecla Strait and is separated from the mainland (Melville Peninsula) to the south by Hooper Inlet.

Igloolik is approximately 360 km northeast of Repulse Bay and 1632 km northeast of Yellowknife.

A.2 History

In 1823 Captain W.E. Parry spent the winter at Igloolik. During the second half of the 19th century, whalers occasionally penetrated into Foxe Basin. In 1937 the Roman Catholic Mission was established. The Hudson's Bay Trading Post followed in 1939. During the 1940's trapping became a major economic activity. By 1959, the addition of a school and new government building led to Igloolik emerging as a settlement of major status in the Baffin region.

A.3 Community Information

Igloolik achieved hamlet status on July 1, 1976. Between 1978 and 1981 the population remained fairly stable with populations of 753 and 746. The economy of the community is based on employment with the Co-op, Hudson's Bay Company, government and hunting. A 1067 m sand runway at an elevation of 51 m ASL is located southwest of the community.

A.4 Geology and Terrain

The island of Igloolik is located in the Foxe Basin region. The glaciers retreated from this region about 5000 years ago.

The island is composed of dolomitic conglomerate with sandstones, dolostone and siltstone occasionally interspersed throughout. The most predominant features on the island are the east and west ridges.

Igloolik is very low, heavily ponded and has extensive tidal foreshore flats. Most surficial deposits are only a veneer on the Palaeozoic beds with raised beached being the most common features. Any drift deposits are subject to extensive frost action. Permafrost is present throughout with the active layer averaging 0.7 m.

A.5 Vegetation

Typical tundra vegetation such as mosses and lichens exist in the region.

A.6 Climate

The climate of Igloolik is distinctly Arctic with January mean high and low temperatures of -23.3°C and -32.8°C. The July mean high and low temperatures are 7.8°C and 3.3°C respectively. The total annual precipitation consists of 190.5 mm of snowfall. The prevailing winds are northeasterly and average 21 km/h. These winds contribute to heavy drifting during the winter.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

Prior to the construction of the new reservoir, the three following sources of water were utilized through the year:

- Airstrip Lake from late May to July after the spring thaw. Its recharge is not sufficient to supply the community year round. In addition, the lake freezes to the bottom in the winter.

- North Lake was the source from July to September. However, it was only used to a limited extent mainly due to its shallow water depth.

- During the winter, East Lake was used. It is 3 m to 6 m deep, and 2.4 km long and has a large capacity. However, it is only accessible by a winter road across Turton Bay.

B.1.2 Source

The source of water for Igloolik is essentially from surface run-off entering South Lake and Airport Lake located about 4 km from the community. The watersheds are relatively small in area, however, sufficient annual recharge is available to supply the Hamlet over a 20 year design life. Water is pumped from South Lake to the reservoir located near the airstrip where it mixes with the water from Airport Lake. A typical chemical analysis is as follows: (NOTE: All values in mg/L unless otherwise noted.)

Parameters	Values
pH	7.8
Total Hardness (as $CaCO_3$)	244.4
Total Alkalinity (as $CaCO_3$)	179.0
Apparent Colour (HU)	7.1
Turbidity (FTU)	0.60
Calcium (as Ca)	63.0
Chloride (as Cl)	174.0
Sulphate (as SO_4)	91.5
Nitrate (as NO_3)	---
Total Iron (as Fe)	0.003

(Sample taken March 17, 1983 for Environmental Health Officer, Health & Welfare Canada, from pumphouse.)

B.1.3 Intake Facilities

An intake facility extends out into South Lake from the South Lake pumping station. Details are as follows:

Length: 30 m
Diameter: 160 mm
Material: hDPE Type III, Class C pipe

The intake pipe is anchored by 16 kg concrete weights placed at 3 m centres. The intake screen is positioned approximately 2 m below the surface. The intake screen is all welded stainless steel with continuous slot construction. Screen slot openings are 1.5 mm with an open area of about 35%. The intake system is only used during the summer months to fill the reservoir by Airport Lake.

A skid mounted portable pumphouse unit is used to pump water to the reservoir. The unit consists of a pump and diesel engine complete with all internal piping and storage tank. The stations are connected to the intake and supply lines with the use of 'Quick Couplers'. The pump specifications are as follows:

Type: Centrifugal
Capacity: 27 L/s @ 523 kPa TDH (350 Igpm @ 175' TDH)
Motor Drive: Diesel engine - 2000 RPM

B.1.4 Supply and Storage

Water is pumped to the reservoir from the South Lake pumphouse via a graded supply line. The specifications are as follows:

Length: 2000 m
Diameter: 160 mm
Material: hDPE Type III, Class C pipe

The storage facilities were constructed in 1979-80 beside Airport Lake. The reservoir consists of a rock excavation with the dimensions 73.7 m x 34.5 m x 10 m deep and a capacity of approximately 30,000 m^3. It was designed to provide an accessible year-round water supply. If the watershed of Airport Lake is also used then the water supply requirements for the next 20 years can be met. The elevation of the site is approximately 52 m, allowing for a future gravity fed piped distribution system. The depth of the reservoir and vertical sides ensure that a minimum amount of water is lost due to ice formation. Seepage problems are minimized since the the surrounding bedrock is constantly frozen.

B.1.6 Pumping Station and Truck Fill Point

A pumping station and a truck fill point are located at the reservoir. A single intake system is provided, equipped with a screen and submersible pump. The intakes are approximately 46 m in length and rest on an incline extending to within 2 m of the reservoir bottom. The pump discharge line is 89 mm diameter polyethylene and is situated within a 250 mm diameter insulated polyethylene pipe. A 16 gauge CMP casing pipe 600 mm in diameter surrounds the intake. A heat trace cable within a 22 mm pipe embedded in the insulation is used as freezing protection. Broken rock surrounds and covers the casing. Steel and concrete anchors secure the pipe in place.

Pumping Facilities:

Pump Type,
Make & Type: Jacuzzi Submersible Turbine
Capacity: 7.6 L/s @ 180 kPa TDh (100 Igpm @ 60'TKh)
Motor: single phase - 3500 RPM, 5 hP
Screen: 250 mm diameter

Since the water is of good chemical quality only chlorination is provided. The hypochlorinator is a Wallace and Tiernan Series A-745.

The truck fill station contains the chlorinator and other equipment. The water truck is filled outside via an overhead pipe assembly.

B.2 Water Distribution

B.2.1 General

All water used in Igloolik is supplied by a trucked system. The delivered supply is supplemented by snow melting to some extent in individual residences. Therefore, the actual consumption rates are higher than the values of the delivered rates.

B.2.2 Trucked System

Water delivery is provided by the hamlet using a 4540 L (1000 Igal) capacity truck. There is a second 4540 L (1000 Igal) capacity truck which is used as a back up vehicle. Water is delivered to homes with pressure systems every second day, while those homes on bagged sewage service receive water twice per week.

B.3 Sewage Collection

A 4540 L (1000 Igal) capacity sewage pumpout truck is used to collect sewage every second day from the 69 homes with pressure systems. All bagged sewage is placed in 204 L (45 Igal) barrels and is collected by the hamlet in a 4-wheel drive stake truck.

The research centre uses humus toilets. In this way their holding tank can be emptied once every 8 months instead of once every day.

B.4 Sewage Disposal

Sewage is disposed of at a location 0.8 km north of the hamlet. Wastes and sewage are not segregated. They are bulldozed and covered with a layer of soil during the summer months.

Liquid sewage is dumped on the ground at the disposal area.

Greywater is discharged on the ground beside residences.

B.5 Solid Waste

B.5.1 Collection

Garbage collection is provided by the hamlet with a 9.2 m^3 Haul-All garbage truck. The solid waste is deposited at the dump site 0.8 km north of the community.

B.5.2 Disposal

Most solid wastes are deposited at the same location as the sewage. Large metal objects are separated and piled at a spot another 0.8 km north, along the ocean shore.

B.6 Roads

There is an adequate amount of sand and gravel available for road construction and maintenance, especially in the area south of the airport.

All of the roads are surfaced with gravel laid directly on a graded ground surface. In winter the roads are essentially snow roads. The condition of the roads in the hamlet is adequate since most of the vehicles are either trucks or tracked machines.

B.7 Surface Drainage

There are some drainage problems in the hamlet, most resulting from the extensive snow drifting and the shallow depth of the active layer. When the snow melts ponding occurs in depressions when culverts are blocked with ice.

B.8 Fire Protection

The fire protection system in Igloolik consists of the following:

- call boxes throughout the community directly connected to a siren - there are 58 people per call box;
- one standard triple combination fire truck capable of pumping over 47 L/s (625 Igpm);
- a firehall; and
- a 10 person volunteer fire brigade.

B.9 Other Services

Other services include two weekly flights, twice weekly mail service, telephone service by Bell Canada, a R.C.M.P. post, a nursing station, and a hotel. NCPC provides power with diesel generator facilities. The community also receives CBC radio and IBC television.

SOURCES OF INFORMATION

1. J.L. Richards & Associates Ltd., Hamlet of Igloolik, Master Plan, November, 1977.

2. Oliver Mangione McCalla & Associates Ltd., Water Supply System, Hamlet of Igloolik, March, 1972.

3. W.L. Wardrop & Associates Ltd., Baffin Region Water Supply Program, Igloolik, N.W.T., March, 1972.

4. Department of National health and Welfare, Public health Engineering Division, (J. Grainge), Report on Water Supplies & Wastes Disposal, Igloolik, N.W.T., November, 1976.

5. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

6. Sapinak, Joanasie, Secretary Manager, hamlet of Igloolik, Personal Communication, June 1983.

7. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Igloolik.

1. GENERAL INFORMATION

Name: Igloolik

Region: Baffin

Classification hamlet

Code Number 609

Northern Community Index: 1.76

Annual Growth Rate (%) 2.9

Community Population:

Total: 746 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: South Lake

Type: Lake

3. WATER TREATMENT

Type: Chlorination

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 2000
(summer filling of reservoir)

Trucked(km): 4.0

6. COMMUNITY WATER STORAGE

Capacity (L): 3.0×10^7
(reservoir)

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: Yes

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

SERVICE

	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	5.2 m^3	9.2 m^3
Drivers Wages $/hr	24964/Yr.	24964/Yr.	23606/Yr.	23606/Yr.
Number of helpers	2	1	1	1
helpers Wages $/hr	24268/Yr.	24268/Yr.	19901/Yr.	19901/Yr.

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.57   Vehicle Freight Rate ($/kg): 0.89

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 0.8

Garbage Disposal Distance (km): 0.8   honeybag Disposal Distance (km): 0.8

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: Land

15. GARBAGE TREATMENT

Type: Occasional Burning/Cover

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	69	74	2	3	1
Persons Per Building	5.2(E)	5.2(E)	N/A	275	N/A
Water - Service	T	T	T	T	T
- Use (L/d)	224.8(b)	106.3(b)	U	U	630.0(b)
- Container (L)	1135(A)	204(A)	U	9897(a)	U
Sewage - Service	PO	hB	PO	PO	PO
- Production (L/d)	234.1(b)	8.3(b)	U	U	U
- Container (L)	U	30	U	U	U
Garbage - Production (m^3/d)	.011(b)	.011(b)	U	0.31(b)	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure systems.
2. Residential without pressure systems.
3. Nonresidential with pressure systems including: Nursing Station, Research centre.
4. School.
5. National health and Welfare Station.

NOTES:

(a) Combined total for all four buildings.
(b) Based on data from Sewage and Solid Waste Inventory Report, Igloolik. (See Sources of Information)

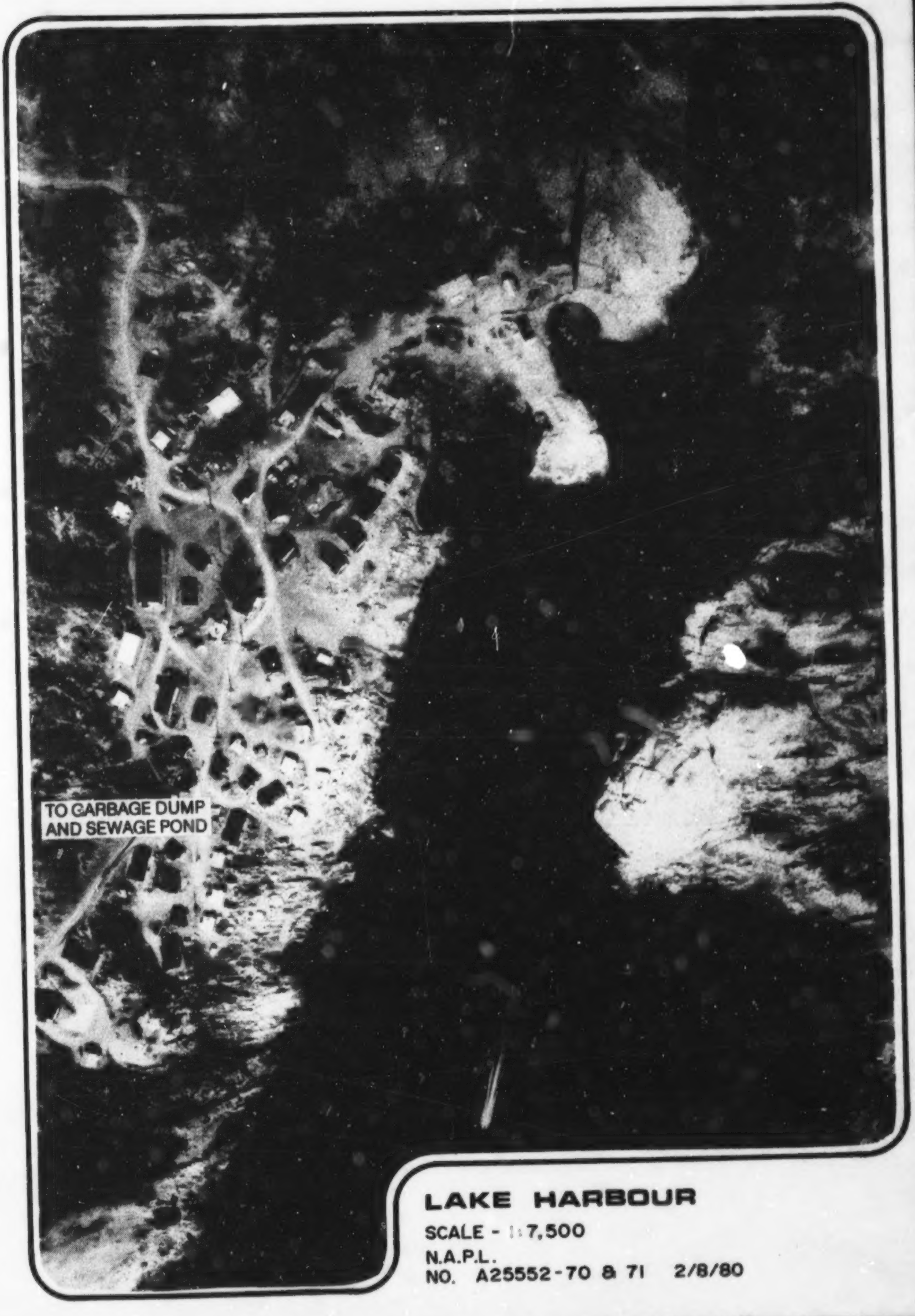
COMMUNITY BUILDING INFORMATION	**BUILDING CATEGORIES**				
	6				
Number of Buildings	1				
Persons Per Building	N/A				
Water - Service	T				
- Use (L/d)	75.8(b)				
- Container (L)	U				
Sewage - Service	PO				
- Production (L/d)	U				
- Container (L)	U				
Garbage - Production (m^3/d)	U				
- Container (m^3)	0.2				

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

6. DIAND Laboratory

Lake Harbour



LAKE HARBOUR

SCALE - 1:7,500

N.A.P.L.
NO. A25552-70 & 71 2/8/80

LAKE HARBOUR

A. GENERAL

A.1 Location

Lake Harbour is located on the southern end of Baffin Island on the Meta Incognita Peninsula at 62°51'N latitude and 69°53'W longitude. It is located at the upper end of a drowned valley some 23 km from the open sea. The hamlet occupies a hummock at an elevation about a metre above sea level.

A.2 History

There have been Inuit in this vicinty for centuries, and they have been in contact with Whites since the mid 19th Century when they worked for the whalers. An Anglican Mission was established in 1900, a Hudson's Bay post opened in 1911, and the R.C.M.P. set up a detachment in 1924.

A.3 Community Information

Lake Harbour achieved hamlet status on April 1, 1982. The hamlet of Lake Harbour is 96% Inuit and the overall population estimates for the past four years are as follows:

POPULATION	YEAR
301	1978
300	1979
297	1980
252	1981

The economy is based on local wage employment, hunting and the sale of handicrafts. There is a nursing station, school and an R.C.M.P. Constable located in the community.

A.4 Geology and Terrain

Lake Harbour is situated on an uneven deposit of granular glacial soil, hemmed in by high hills of precambrian rock with some deposits of limestone. Below the hamlet there is a stoney beach at high tide level.

Bedrock is exposed extensively throughout the region and consists primarily of quartzite, schist and limestone. Quartzite and schist are resistant to mechanical breakdown caused by the freeze-thaw cycles. Limestone is very susceptible to mechanical weathering. The area lies almost on a line separating the widespread discontinuous and continuous permafrost zones, indicating that permafrost is present under most land areas to a depth of 60 m.

A.5 Vegetation

Vegetation is generally non-existant in the surrounding mountains with the exception of few hardy mosses, lichens, or grasses.

A.6 Climate

Lake Harbour experiences unusually high temperatures for the Arctic and its sheltered location gives rise to rather mild winters. The mean high and low temperatures for July are 12°C and 4.0°C respectively. January's mean high and low are -20°C and -27°C. Lake Harbour receives 202 mm of rain and 2100 mm of snow on average annually.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

The residents currently obtain water from Lake Fundo approximately 2 km west of the community. In the summer the intake hose is suspended in the lake and the truck is filled on the shore. During the winter a hole in the ice about 60 m from shore, is kept open to fill the truck using truck mounted pumping facilities.

Cost effective analysis studies on water supply alternatives have been carried out by the G.N.W.T. The studies suggest that the preferred alternative is for a truck fill station at Lake Fundo and the road linking the lake to the hamlet be upgraded.

B.1.2 Source

The present source and apparently the most economical for present and future purposes is Lake Fundo. It is located 2 km west of the hamlet at an elevation of 34 m ASL. A typical chemical analysis is as follows: (NOTE: All values in mg/L unless otherwise noted)

Parameters	Values
pH	8.22
Total Hardness (as $CaCO_3$)	76.7
Total Alkalinity (as $CaCO_3$)	70.2
Apparent Colour (HU)	7.1
Turbidity (FTU)	0.40
Calcium (as Ca)	24.0
Chloride (as Cl)	5.0
Sulphate (as SO_4)	14.0
Nitrate (as NO_3)	0.1 <W
Total Iron (as Fe)	0.01 <T

(Sample taken March 15, 1983 for Environmental Health Officer, Health & Welfare Canada.)

B.2 Water Distribution

The Hamlet Council of Lake Harbour does the local water delivery. A 4540 L (1000 Igal) capacity water truck is used to service houses in the community three times per week. There is no treatment of the water delivered in Lake Harbour.

B.3 Sewage Collection

Both bagged and pumpout sewage are picked up by the hamlet. Liquid pumpout sewage is collected by a Ford F600 1978 pumpout truck with a tank capacity of 4540 L (1000 Igal). Bagged sewage pickup is done using a Ford 350 4x4 stake truck. The bags are thrown in barrels mounted on the back of the truck. Bagged sewage is collected six days per week in the morning while sewage holding tanks in Lake harbour are pumped out three days per week.

B.4 Sewage Disposal

The sewage disposal area is located 0.8 km to the south of the community at the garbage dumpsite, which is, high in a valley. Access is over a winding gravel road. Pumpout sewage and sewage bags are segregated from each other, and from solid refuse at the dump site. Liquid waste then leaches through the gravel and down a slope between the dump and the ocean inlet. Large tidal currents transport and dilute any effluent which enters the ocean.

B.5 Solid Waste

Solid Waste is collected by the hamlet on the same days as bagged sewage, with garbage picked up in the afternoon.

Abandoned bulldozers, trucks, washing machines and other mechanical devices are piled separately close to the new tank farm.

The dump site is located 0.8 km south of the townsite. Solid waste is separated from the other types of waste at the dump, as is liquid sewage. Dump maintenance consists of weekly burning and occasional cover when fill is available to do so.

B.6 Roads

The roads in and around the community generally have steep grades. This can cause some problems with slippage, gas mileage, and greater wear and tear on vehicles. Many of the roads erode away during periods of rapid run-off. There are ample sources of gravel nearby for maintenance and construction.

B.7 Surface Drainage

Many of the roads are eroded by overland drainage. Proper drainage trenches, culvets and embankments would prevent this. The present haphazard arrangement of buildings also results in poor drainage of water. Dangerous ice sheets occur occasionally in the winter.

B.8 Fire Protection

The fire protection in Lake harbour consists of the following:
- one mini-pumper capable of pumping 11-34 L/s (150-450 Igpm)
- 10 man volunteer fire brigade.

8.9 Other Services

There is a telephone service in Lake harbour. Mail delivery is once a week from Frobisher Bay. Power is supplied by NCPC using diesel generator facililties.

SOURCES OF INFORMATION

1. Scott Brown, Department of Public Works, Lake harbour Water, Sewage and Garbage Pre-design Report, 1980.

2. Jack Grainage, health and Welfare Canada, Medical Services, Report on Water Supply & Waste Disposal, Lake harbour, N.W.T., March, 1977.

3. Johnson, Andrew Secretary Manager, hamlet of Lake harbour, Personal Communication, June 1983.

4. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Personal Communication, June 1983.

1. GENERAL INFORMATION

Name: Lake harbour

Region: Baffin

Classification hamlet

Code Number 801

Northern Community Index: 1.62

Annual Growth Rate (%) 3.0

Community Population:

Total: 252 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Lake Fundo

Type: Lake

3. WATER TREATMENT

Type: None

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 2.0

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	hONEYBAG	GARBAGE
TRUCK SIZE	4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	13.65	13.65	13.65	13.65
Number of helpers	1	1	1	1
helpers Wages $/hr	12.17	12.17	12.17	12.17

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.58   Vehicle Freight Rate ($/kg): 0.77

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 0.8

Garbage Disposal Distance (km): 0.8   honeybag Disposal Distance (km): 0.8

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: Land

15. GARBAGE TREATMENT

Type: Burning/occasional cover

16. GARBAGE DISPOSAL

Type: Land

17. hONEYBAG TREATMENT

Type: None

18. hONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	34	17	9	3	3
Persons Per Building	4.7(E)	4.7(E)	N/A	N/A	90
Water - Service	T	T	T	T	T
- Use (L/d)	31.6(a)	31.6(a)	U	U	31.6(a)
- Container (L)	1135(A)	204(A)	U	U	1135(A)
Sewage - Service	PO	HB	PO	HB	PO
- Production (L/d)	31.6(a)	U	U	U	31.6(a)
- Container (L)	2270(A)	30	U	30	2270(A)
Garbage - Production (m^3/d)	.049(b)	.049(b)	U	U	0.088(b)
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

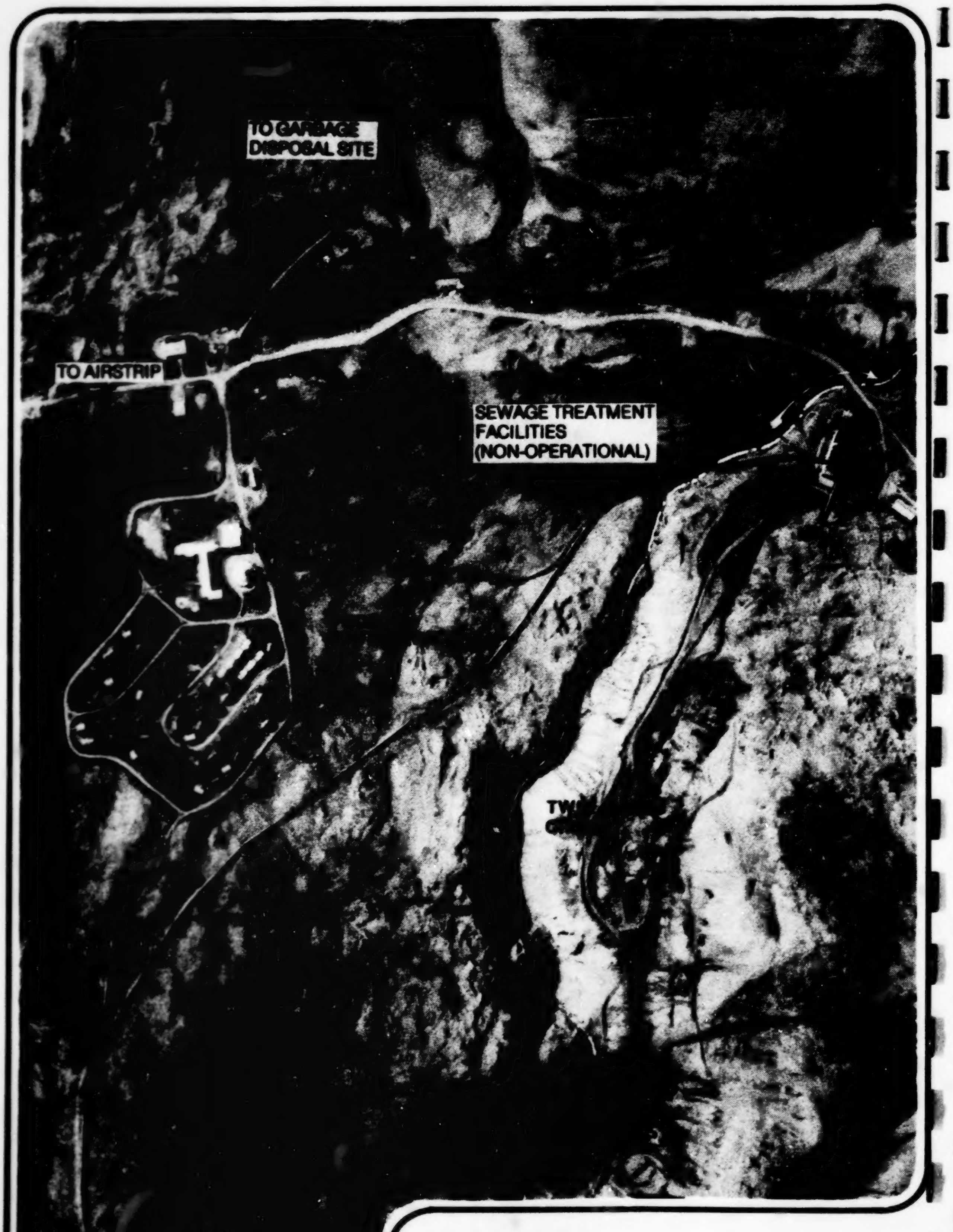
1. Residential with pressure systems.
2. Residential without pressure systems.
3. Nonresidential with pressure systems including: 2 HBC Buildings, 2 RCMP Buildings, 2 Hamlet Buildings, Nursing Station, Hamlet Office, Fish & Wildlife Office.
4. Nonresidential without pressure systems including: 1 HBC Building, R.C. Mission, DPW Building.
5. School.

NOTES:

(a) Estimated value from - Lake Harbour, Water, Sewage and Garbage Pre-design Report, April 1980, Department of Public Works.

(b) Estimated values from - Sewage and Solid Waste Inventory Report, Lake Harbour, Department of Local Government.

Nanisivik



NANISIVIK

SCALE - 1:5,000

N.A.P.L.
NO. A25436-58 & 60   9/8/80

NANISIVIK

A. GENERAL

A.1 Location

Nanisivik is located 735 km north of the Arctic Circle at a latitude of 73°08'N and longitude of 84°25'W. It is situated on the south shore of Strathcona Sound, a deep water fiord off Admiralty Inlet on the Borden Peninsula of Baffin Island. The closest community to Nanisivik is Arctic Bay, 27 km to the west. Frobisher Bay is approximately 1280 km southeast.

A.2 history

The first recorded exploration of this region was by Admiral Perry in 1820. Mineral finds were first reported during a Canadian Government Expedition in the years 1910-11. By 1937, four claims were staked in the area. In 1954, R.G. Blockadar of the Geological Survey of Canada mapped the area and from then until 1974, exploration was continuous. The development of the lead/zinc mine and townsite at Nanisivik since 1974 has been under the direction of Strathcona Mineral Services Ltd.

A.3 Community Information

Nanisivik is classified as an unorganized settlement. Between 1978 and 1980 the population decreased only slightly from 273 to 261. The economy of the community is dependent entirely on Nanisivk Mines Ltd.

Community services include two R.C.M.P. Constables, a primary school and a bank. There is a 1950 m x 46 m gravel runway southwest of the community, at an elevation of 640 m ASL.

A.4 Geology and Terrain

The geological formations in the immediate vicinity of the settlement consist of a platform of Society Cliffs dolomite about 11 km in length from east to west, and about 6.4 km wide from north to south along the south shore of Strathcona Sound. The southern boundary of the property is marked by the northern edge of the Adam Sound quartzite plateau. At the site, the elevation varies from sea level at the harbour to 640 m at the airport. Strathcona Sound is bordered by very steep sedimentary cliffs and bluffs. Natural sand and material suitable for crushing is found at a number of locations.

The predominant surface soils in the area consist of reddish coloured dolomite drift and thinly laminated softer dolomite shale in various degrees of weathering.

The permafrost is 15 cm to 20 cm below the surface in low lying areas and 90 cm to 120 cm in well drained areas.

A.5 Vegetation

Tundra vegetation is present in limited quantities. A small area of hardy grasses in the townsite and a few small patches of lichens are the only form of vegetation present.

A.6 Climate

The July mean high and low temperatures are 10°C and 2°C respectively. The January mean high and lows are -26°C and -33.5°C respectively. The average annual precipitation arrives as 58 mm of rain and 837 mm of snow. Winds are predominantly from the northwest at an average speed of 11.4 km/hour. Gusts up to 125 km/hour can occur.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 General

This system was built at the same time the mine and settlement was constructed. It serves both the settlement and the mill. The domestic and industrial water supplies are drawn from East and West Twin Lakes respectively through similar intake facilities.

B.1.2 Source

East Twin Lake located about 3 km southeast of the community is the potable water source for Nanisivik. The chemical quality of the water is acceptable with its chemical characteristics meeting potable water standards. The lake has a volume of about 496 million L (109 million Igal) and an annual inflow of approximately 454 million L (100 million Igal) from the watershed.

A typical water quality analysis is as follows: (All values in mg/L unless otherwise noted)

Parameters	Values
ph	8.31
Total hardness (as $CaCO_3$)	21.3
Total Alkalinity (as $CaCO_3$)	17.2
Apparent Colour (T.U)	8.9
Turbidity (FTU)	5.40
Calcium (as Ca)	---
Chloride (as Cl)	1.6
Sulphate (as SO_4)	---
Nitrate (as NO_3)	---
Total Iron (as Fe)	0.22

(Sample taken October 17, 1982 for Environmental Health Officer, Health & Welfare Canada).

The industrial supply, for mine and mill use, is taken from nearby West Twin Lake.

B.1.3 Intake Facilities

The intake consists of an upright 1.8 m diameter wetwell buried inside 70 m gravel causeway extending to a water depth of 3.7 m. A pipeline from the base of the well extends to a water depth of 6 m. The water is heated by an electric submersible heater. There is a continuous overflow discharging back into the wetwell.

B.1.4 Treatment

There is no treatment of the water supply at the present time.

B.1.5 Storage

Storage is provided by an insulated 681,900 L (150,000 Igal) standpipe reservoir. It is located on a hill east of the settlement and the top water level in the tank is slightly below the elevation of East Twin Lake.

The storage tank was designed to supply a fire demand of 38 L/s (500 Igal/min) for 4 hours with a reservoir of 113,650 L (25,000 Igal).

It also provides equalization for peak hours demands since the pumps are rated at the maximum daily flow requirement.

B.1.6 Pumping Facilities

There are two electric centrifugal submersible pumps situated in the intake line.

A 4.32 km transmission main extends to the mill with a 150 m branch line to the settlement and a 102 m line to the reservoir (see aerial photo).

The pipelines are 100 mm and 150 mm in diameter bearing the following specifications:

Type:	"Sclaircor" HDPE
Insulation:	50 mm polyurethane
Covering:	sheet metal cladding
Freeze Protection:	electric heat tracing cable

The reservoir is located above to the community and the mine mill creating 45.7 m of static head at the community and 122 m at the mill.

Domestic supply requirements have been based on an average day demand of 273 Lpcd, a maximum day demand of 545 Lcpd and a peak rate of 909 Lpcd for a population in excess of 850 people. The mill domestic requirements have been provided for at 31,822 L/day (7000 Igal/day).

B.2 Water Distribution

The townsite is serviced by a utilidor utility system.

Water is distributed through 150 mm PVC mains with continuous recirculation. Water is supplied at a pressure between 276 kPa and 414 kPa (40 to 60 psi).

The distribution system is looped through the Town centre heating plant where recirculation pumps maintain a flow in the lines. Boilers are provided in the heating plant to maintain sufficient water temperatures to prevent freezing of the water mains.

The utilidor houses the water line and sewer main within a plywood box *insulated with styrospan. It is shallow buried at the rear lot lines.*

Circulation in the supply and return service connection loop, is achieved by the velocity head created between two pitorifices which form part of the main connection. These lines are also traced with heating cable for emergencies.

Hydrants are spaced at strategic points.

B.3 Sewage Collection

All sewage is collected via gravity mains contained in the utilidor. The sewage main consists of a 150 mm PVC pipe contained in the utilidor system with the water main. The gravity sewer system discharges sewage to the sewage treatment facilities described in the following section.

B.4 Sewage Treatment and Disposal

As part of the Nanisivk development, facilities for secondary sewage treatment of sewage were provided.

Initially, an Aer-o-Flo extended aeration treatment plant was constructed and used on a temporary basis. This plant was rated at 45,500 Lpd (10,000 Igpd) and was designed as part of the first stage of development at the site to serve a 100 man camp. It was located just north of the present townsite area. In 1977, new treatment facilities were constructed at a site located west of the mill and powerhouse (see aerial photo).

The present system provides for primary settling and secondary aerated bio disc treatment followed by final clarification and chlorination prior to discharge.

The existing extended aeration plant was incorporated into the system and is used as a surge and sludge storage tank. This is followed by an Autotrol Bio Surf Unit which is designed to handle 180,000 Lpd (40,000 Igpd). The design service level was 400 people with an additional allowance of 32,000 Lpd (7000 Igpd) for the mill dry house - shower wastes. All components are housed in a 15.2 m by 12.2 m standard rigid frame pre-engineered building.

At present any treatment facilities are bypassed by the sewage due to problems with the treatment system. Essentially all sewage is discharged untreated, directly at the outfall.

B.5 Solid Waste

Garbage pickup for houses occupied by mine employees is done by Nanisivik Mines Ltd. A garbage packing truck is utilized for this purpose. D.P.W. provides garbage pickup for government houses in Nanisivik.

The solid waste disposal area is located west of the settlement near the Stolport. A landfill method, with burning on a regular basis, has been adopted. Disposal is on the edge of a ravine with partial covering with dirt during summer periods.

The site drains westerly away from the townsite and other activity areas.

B.6 Roads

All road allowances are designed at a 15 m width with a 7.3 m gravelled carriage-way. There are ample sand and gravel deposits in the Twin Lakes area that are suitable for road construction and maintenance.

B.7 Surface Drainage

Site grading has provided for ditches and road culverts where necessary for storm water removal. Careful lot grading allows drainage away from the utilidor system to lessen the possibility of surface water entering into the box.

B.8 Fire Protection

There is room for a fire truck garage and office in the town centre building. Equipment consists of a fire truck with a 13,620 L (3000 Igal) storage tank with a pumping capacity of 63 L/s when hooked to a hydrant. There is a 14 man volunteer fire brigade, and a 64 L/s 1033 kPa firetruck. Major buildings have sprinkler systems installed. All units will have fire detectors and will be connected through an alarm system with the power house control centre.

B.9 Other Services

Other services include telephone service provided by Bell Canada and mail service five times a week. Power is generated by four 1500 kW diesel generating units at the mill pumphouse and is owned and operated by Nanisivik Mines.

SOURCES OF INFORMATION

1. Underwood McLellan & Associates, General Development Plan, Nanisivik, N.W.T., April, 1977.

2. Government of the Northwest Territories, D.P.W., Specification; Nanisivik Sewage Treatment Plant Modifications, May, 1979.

3. Jack Grainge, Health and Welfare Canada, Medical Services, N.W.T. Region, Report on Water Supplies & Wastes Disposal, Nanisivik, N.W.T., December, 1976.

4. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June 1983.

5. Otak, Leah, Area Service Officer, Government of the N.W.T., Nanisivik, Personal Communication, June 1983.

1. GENERAL INFORMATION

Name: Nanisivik

Region: Baffin

Classification NSC

Code Number 708

Northern Community Index: 1.77

Annual Growth Rate (%) 0.9

Community Population:

Total: 261 Year: 1981

Piped: 261 Year: 1983

2. WATER INTAKE/SOURCE

Name: East Twin Lake

Type: Lake

3. WATER TREATMENT

Type: None

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 3040

Trucked(km): None

6. COMMUNITY WATER STORAGE

Capacity (L): 681,900

7. WATER DISTRIBUTION PUMPHOUSE

Type: Yes

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: Utilidor Utility System

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	NA	NA	NA	9.2 m^3
Drivers Wages $/hr				
Number of helpers				
helpers Wages $/hr				

Distance Between Buildings (m): 10

Vehicle Fuel Cost ($/L): 0.60 Vehicle Freight Rate ($/kg): 0.87

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): 1400
Trucked(km): None

Garbage Disposal Distance (km): 0.8 honeybag Disposal Distance (km): None

13. SEWAGE TREATMENT

Type: Aeration Plant
(nonoperational)

14. SEWAGE DISPOSAL

Name: Ocean
Type: Ocean Outfall

15. GARBAGE TREATMENT

Type: Burning/Landfill

16. GARBAGE DISPOSAL

Type: Landfill

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: None

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	81	1	1	2	1
Persons Per Building	3.2	56	NA	NA	NA
Water - Service	P	P	P	P	P
- Use (L/d)	273 (a)	U	U	U	31822
- Container (L)	NA	NA	NA	NA	NA
Sewage - Service	P	P	P	P	P
- Production (L/d)	273 (a)	U	U	U	31822
- Container (L)	NA	NA	NA	NA	NA
Garbage - Production (m^3/d)	U	U	U	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

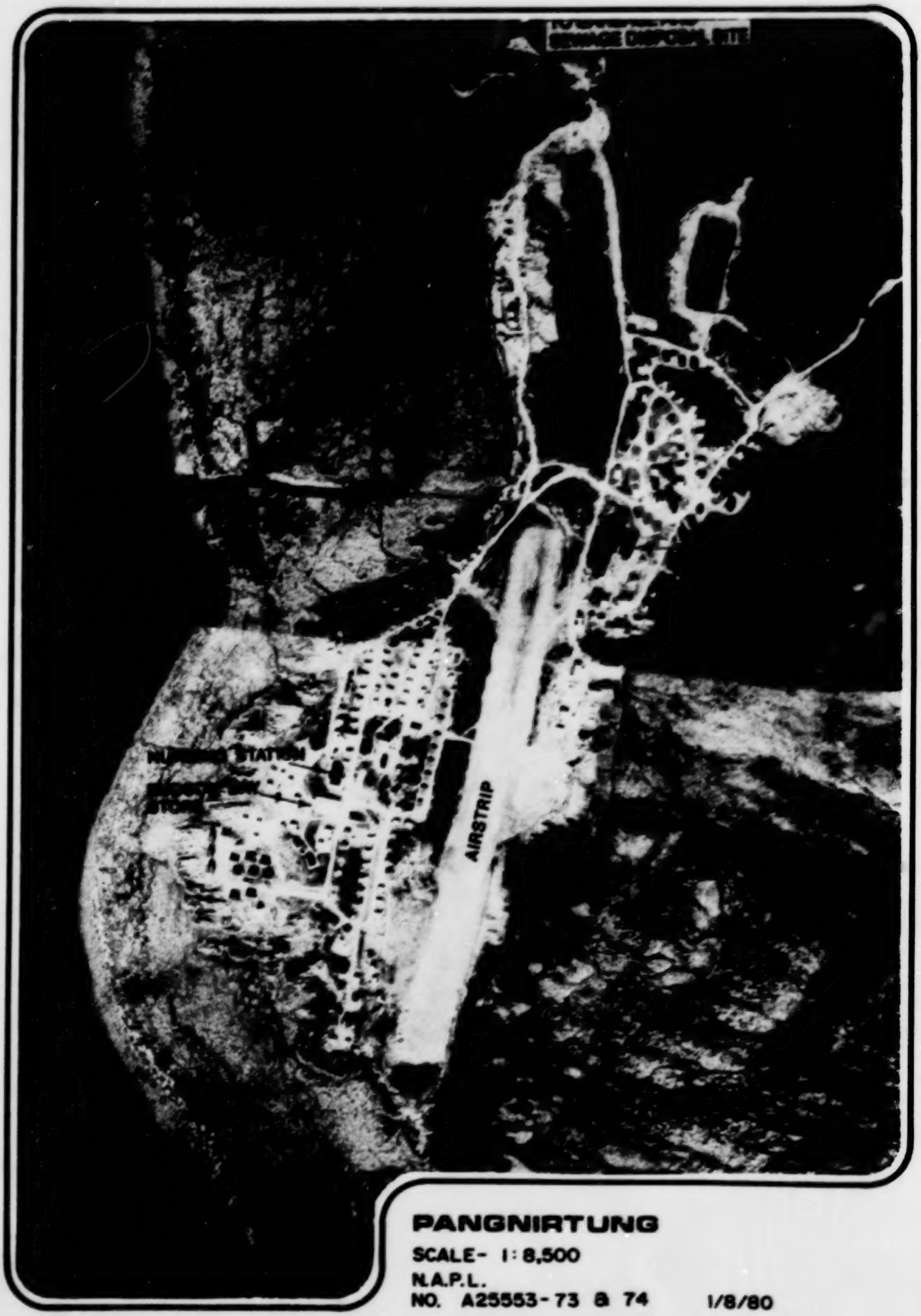
BUILDING CATEGORIES:

1. Residential with piped water and sewage.
2. School.
3. Nursing Station/hospital.
4. Community Complex including: Gym, Swimming Pool, Rink.
5. Mill (Nanisivik Mines Ltd.).

NOTES:

(a) Average daily domestic supply requirements from General Development Plan, Nanisivik, Underwood, McLellan & Associates, April, 1977.

Pangnirtung



PANGNIRTUNG

SCALE- 1: 8,500
N.A.P.L.
NO. A25553-73 & 74 1/8/80

PANGNIRTUNG

A. GENERAL

A.1 Location

Pangnirtung is located on the southeastern shore of Pangnirtung Fiord, Cumberland Peninsula, Baffin Island at an approximate latitude of 66°09'N and longitude 65°45'W. By air it is 300 km north of Frobisher Bay.

A.2 History

Whalers and explorers began visiting the area around 1600. An Anglican Mission became established at a whaling station at Black Lead Island, near the south shore of Cumberland Sound, in the late 1800's. The Mission moved to Pangnirtung in 1926. In 1921, the Hudson's Bay Company established a post and the R.C.M.P. started a detachment in 1923. Shortly after that, a hospital was built by the Mission in 1931. Over these years, a school was opened and a nursing station was also established.

A.3 Community Information

Pangnirtung achieved hamlet status on April 1, 1972. Between 1978 and 1981, the population of the hamlet decreased from 873 to 839. The economy of the community is mainly dependent on the Federal and Territorial governments. The Hudson's Bay Company and Peyton Lodge also employ a sizeable number of the local people.

Community services include two R.C.M.P. constables, two nurses, community centre, primary school and library.

A 825 m X 30 m gravel surfaced airstrip bisects the community.

A.4 Geology and Terrain

The community occupies a position generally situated on the remains of a tidal beach, glacial drift and an old river delta inland from the present delta to the east. The maximum depth from foreshore flat to the plateau behind the community is about one-half mile. The hamlet is bounded on the north and west by the fiord, on the south by steep hills and on the east by the Duval River.

A.5 Vegetation

Vegetation consists of mosses and lichens with the odd stand of hardy grasses.

A.6 Climate

The climate in Pangnirtung is severe. The July mean high and low temperatures are 11.1°C and 3.9°C respectively. The January mean high and lows are -25.6°C and -37.8°C respectively. The total average yearly precipitation of 341 mm consists of 162 mm rain and 1803 mm of snowfall.

B. MUNICIPAL SERVICES

B.1 Water Supply

B.1.1 Source

During the summer, water is pumped into a storage reservoir from the Duval River at a point approximately 1 km east of the community for winter storage (see aerial photo).

During the summer, water is taken directly from the Duval River. In the winter the reservoir is the source of water for the community. A typical chemical analysis follows: (All values in mg/L unless otherwise noted.)

Parameters	Values	
	Duval River	Reservoir
ph	7.97	8.78
Total hardness (as CaCO3)	1.2	2.9
Total Alkalinity (as $CaCO_3$)	3.2	4.4
Calcium (as Ca)	0.5	1.0
Chloride (as Cl)	<1.0	1.8
Sulphate (as SO_4)	1.5	3.0
Nitrate (as NO_3)	<0.1	<0.1
Total Iron (as Fe)	<0.01	0.94

(Sample taken July 28, 1982 for Environmental health Officer, health and Welfare Canada.)

B.1.2 Storage

During the summer, water is pumped into the reservoir from the Duval River. There it is stored for winter use. The construction of the reservoir in 1967 required burning fuel oil to melt the permafrost and bulldozing the frozen and unfrozen gravel. The reservoir is roughly 67 m X 183 m with 7.6 m high berms at the deepest end.

The useable volume of water assuming at least 2 m of ice, is in the range of 9 million litres (2 million Igal). With 0.6 m (2 ft.) freeboard, the useable volume with no ice, is roughly 18 million litres (4 million Igal).

An invesstigation in 1972 revealed seepage into and out of the reservoir and in 1976, a 30 mil hypalon liner was added. Air vent pads were installed on the liner above the high water level at 10 m centres lengthwise and 4.6 m centres across the reservoir. The reservoir does not have a subdrainage system and liner "ballooning" has subsequently occurred due to water pressure build-up beneath the liner.

B.1.3 Intake Facilities

Intake facilities in the reservoir consist of an insulated underground heat traced pipe with the following specifications:

Length:	21.3 m
Diameter:	50 mm
Type:	Schedule 40 Steel Pipe

The deep well submersible pump is located in the intake and is used to fill the water truck.

B.1.4 Pumping Facilities

Pumping facilities consist of a deep well submersible pump in the intake. Pump specifications are as follows:

Type:	TRW Pleuger of Canada P63, 2 stage.
Motor:	4-1/2 hP, 208 volt, 3 phase, 60 cycle.
Capacity:	9.5 L/s @ 208 kPa TDh (125 Igpm @ 70' TDh)

The truck fill station at the reservoir consists of an insulated heated building, including chlorination facilities, water meter and storage space.

B.1.5 Treatment

Treatment can be provided by a Wallace and Tiernan hypochlorinator equipped with a 136 L (30 Igal) polyethylene chemical feed tank and an electric mixer. however, due to taste problems experienced by the community as a result of the chlorination, this treatment was discontinued. Treatment now consists of adding bleach directly to the water in the delivery truck.

B.2 Water Distribution

Water delivery is done by the hamlet using two 4540 L (1000 Igal) capacity water trucks. Residences are serviced three times per week. The hotel is the only building in the community which has a piped water supply.

B.3 Sewage Collection

Bagged sewage and liquid sewage are collected by the hamlet. Liquid sewage from holding tanks is pumped out using a 4540 L (1000 Igal) capacity sewage truck. A similar 4540 L (1000 Igal) sewage truck is used as a backup.

Bagged sewage is removed from inside each house and hauled away using a 3/4 ton stake truck. On the truck, the bags are placed in barrels so that spillage is minimized.

B.4 Sewage Disposal

Bagged sewage and liquid pumpout sewage are disposed of at the dump site. They both are segregated from the solid refuse at the dump.

Plans were underway to improve the present methods of disposal by constructing a macerator east of the hamlet. This facility was intended to accept bagged sewage and pumpout liquid wastes and macerate the contents prior to disposal, these plans have been suspended pending further investigations on the design and operation of the facility.

B.5 Solid waste

Garbage is placed in 204 L (45 Igal) drums and collected daily. It is carried out under contract by the hamlet and is presently disposed of in the same manner and location as sewage bags. however, the solid waste is separated from sewage bags and liquid pumpout sewage at the dump site.

Plans were underway to construct incineration facilities designed to reduce the volume of wastes and, thereby eliminate nuisance and other disposal problems. These plans have been suspended until further investigations have been carried out on the cost effectiveness, and operational characteristics of the facilities.

B.6 Roads

Road surfaces throughout the community are generally in poor condition.

Good road building materials are not present in a natural state. Mixing and crushing operations would be required to provide a suitably graded material for road construction.

B.7 Surface Drainage

The steep inclines behind the hamlet tend to produce a high peak volume in the spring-summer thaw. This results in a more active soil layer with a high degree of solifluction and soil creep. The present alignment of the roads also hinders surface drainage.

B.8 Fire Protection

Fire protection in Pangnirtung consists of the following:

- call boxes throughout the community directly connected to a siren;
- an office and firehall in one building;
- a 21 person volunteer fire brigade; and
- one 47 L/s front mount truck.

B.9 Other Services

There is twice weekly mail service, a local news paper, and a telephone system operated by Bell Canada. Power is supplied by NCPC using diesel generation facilities.

SOURCES OF INFORMATION

1. W.D. Buchanan Ltd., General Development Plan, Pangnirtung, N.W.T., May, 1979.

2. Health and Welfare Canada, Medical Services N.W.T. Region, Report on Water Supplies & Waste Disposal, Pangnirtung, N.W.T., November, 1976.

3. J.L. Richards & Associates Ltd., Report on Waste Disposal Study Pangnirtung, N.W.T., January, 1980.

4. Government of the N.W.T., Department of Public Works, Specifications for Incinerator and Sewage Disposal Facility Pangnirtung, N.W.T., May, 1979.

5. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June, 1983.

6. MaGee, Lucy, Acting Secretary Manager, Hamlet of Pangnirtung, Personal Communication, June, 1983.

7. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Pangnirtung.

1. GENERAL INFORMATION

Name: Pangnirtung

Region: Baffin

Classification hamlet

Code Number 804

Northern Community Index: 1.70

Annual Growth Rate (%) 2.8

Community Population:

Total: 839 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Reservoir - Winter
Duval River - Summer

Type: River/Reservoir

3. WATER TREATMENT

Type: Addition of Bleach

4. SOURCE PUMPHOUSE

Type: None - Summer
Yes - Winter (at reservoir)

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 1.0

6. COMMUNITY WATER STORAGE

Capacity (L): 6.4×10^6
(reservoir)

7. WATER DISTRIBUTION PUMPHOUSE

Type: Yes (at reservoir)

8. TRUCK FILL POINT

Type: None - Summer
Yes - Winter (at reservoir)

9. PIPED DISTRIBUTION AND COLLECTION

Type: Water Supply Line to hotel.

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	2 @ 4540 L	2 @ 4540 L	5.2 m^3	5.2 m^3
Drivers Wages $/hr	13.59	13.81	13.81	13.81
Number of helpers	0	0	1	1
Helpers Wages $/hr	---	---	13.81	13.81

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.57 Vehicle Freight Rate ($/kg): 0.77

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 1.2

Garbage Disposal Distance (km): 1.2 Honeybag Disposal Distance (km): 1.2

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: None
Type: Land

15. GARBAGE TREATMENT

Type: Burning/Incineration
(under construction)

16. GARBAGE DISPOSAL

Type: Land/Incineration
(under construction)

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	20	65	82	7	1
Persons Per Building	3.4 (E)	6.2 (E)	4.5 (E)	NA	NA
Water - Service	T	T	T	T	T
- Use (L/d)	155 (a)	429 (a)	113 (a)	197 (a)	36 (a)
- Container (L)	1135 (A)	1135 (A)	204 (A)	U	204 (A)
Sewage - Service	PO	PO	HB	PO	HB
- Production (L/d)	155 (a)	429 (a)	U	197 (a)	U
- Container (L)	1135 (A)	1135 (A)	30	U	30
Garbage - Production (m^3/d)	0.050(b)	0.050(b)	0.050(b)	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure systems.
2. Residential (Housing Association) with pressure systems.
3. Residential (Housing Assoiciaton) without pressure systems.
4. Nonresidential with pressure systems including: nursing station, dental therapist, National Park (4), HBC Store.
5. Nonresidential without pressure systems including: Inuit co-op.

NOTES:

(a) Based on recorded water use and estimated nonrecorded water use, Sept. 1980 to August 1981, by MacLaren Engineering Inc., for Study on Stage 2, Future Water Supply, Pangnirtung, January, 1983.
- average water use in each category over September 1980 to August 1981, with abnormal values disregarded, is shown.

(b) Based on Data from Sewage and Solid waste Inventory Report, Pangnirtung. (See Sources of Information)

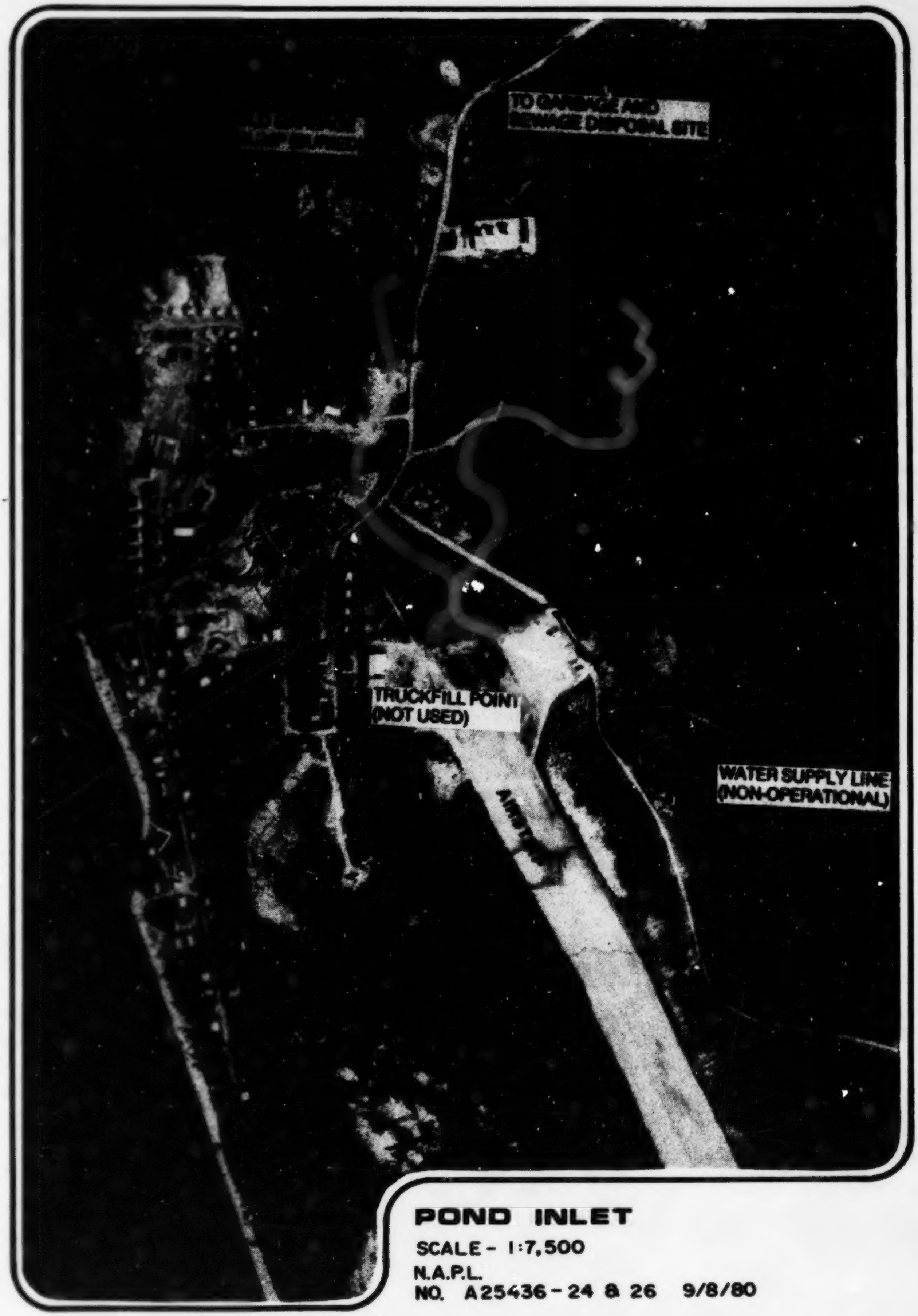
COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	6	7			
Number of Buildings	1	1			
Persons Per Building	307	NA			
Water - Service	T	P			
- Use (L/d)	2243 (a)	646 (a)			
- Container (L)	6810	NA			
Sewage - Service	PO	PO			
- Production (L/d)	2243 (a)	646 (a)			
- Container (L)	U	U			
Garbage - Production (m^3/d)	0.002(b)	U			
- Container (m^3)	0.2	0.2			

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

6. School
7. Hotel

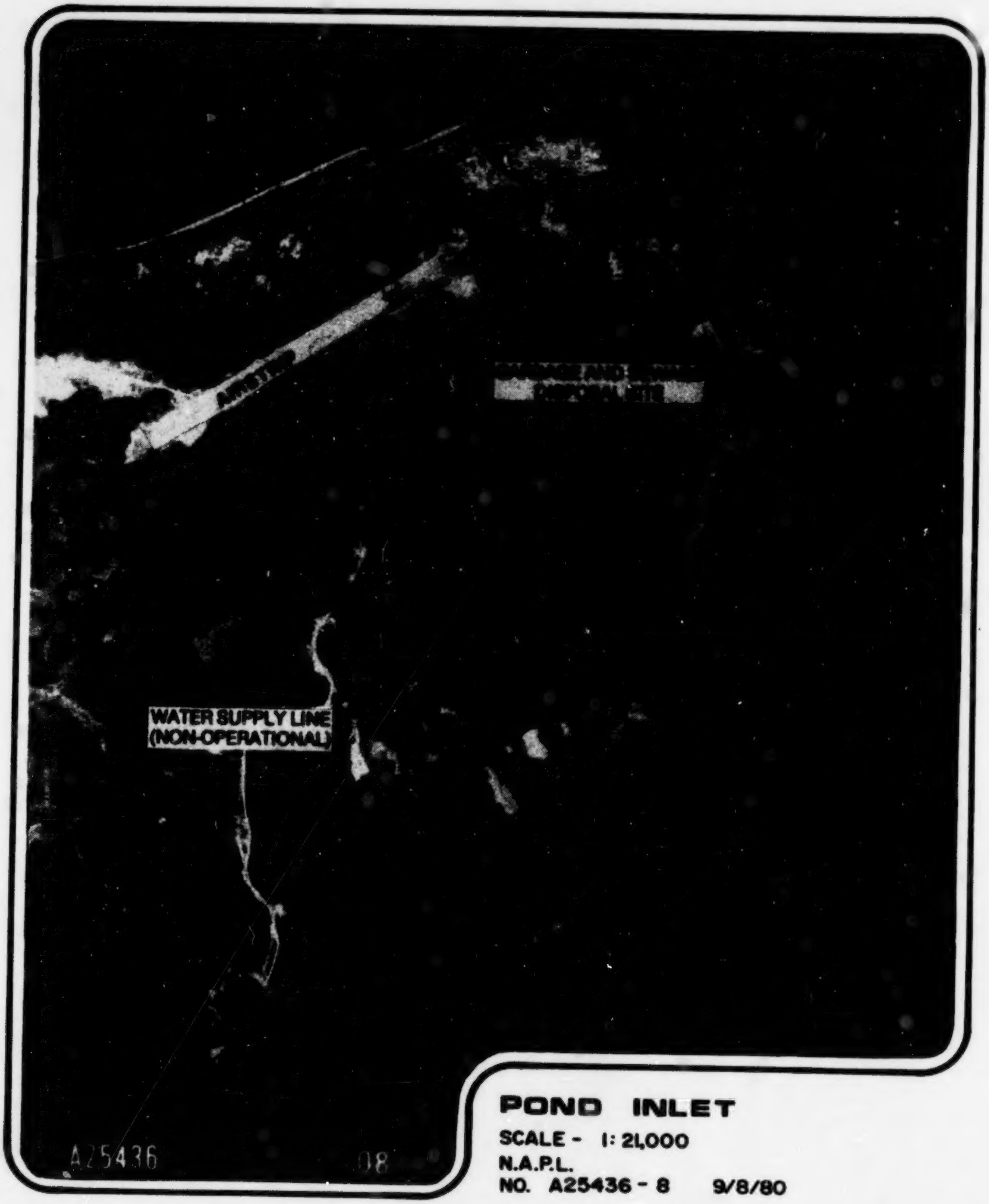
Pond Inlet



POND INLET

SCALE - 1:7,500

N.A.P.L.
NO. A25436 - 24 & 26 9/8/80



POND INLET

SCALE - 1: 21,000
N.A.P.L.
NO. A25436 - 8 9/8/80

POND INLET

A. GENERAL

A.1 Location

Pond Inlet is located at a latitude of 72°41'N and longitude 78°00'W on Eclipse Sound in the northeast region of Baffin Island. It is approximately 575 km southeast of Resolute Bay.

A.2 history

Pond Inlet is also the name of the body of water between Baffin Island and Bylot Island. The inlet was discovered by Arctic Explorer, W.E. Parry.

In the period from 1880 to 1900, whalers and free traders frequented Albert harbour, 27 km east of the present site.

The hudson's Bay Company arrived in 1921 and the R.C.M.P. set up a post in 1922. In 1926, Catholic and Anglican Missions were established. A school was built by the Federal Government in 1960.

A.3 Community Information

Pond Inlet achieved hamlet status on April 1, 1975. The population has risen from 649 to 705 during the period 1978 to 1981.

The economy of the community is based primarily on hunting seal and whale, fishing, trapping and carving.

Community services include a two man R.C.M.P. detachment, a nursing station, two churches, hotel and a primary school. A 1220 m X 30 m gravel surfaced airstrip is located southeast of the community at an elevation of 57 m ASL.

A.4 Geology and Terrain

The settlement occupies a fairly hilly area near the south shore of Eclipse Sound. It is on the tip of an extensive glacial deposit. The galcial till is composed mainly of sand, with lesser quantities of gravel and silt.

A.5 Vegetation

Vegetation in Pond Inlet is sparse and consists primarily of mosses, lichens and a few hardy grasses.

A.6 Climate

The July high and low mean temperatures are 8.5°C and 1.5°C respectively. The January high and low mean temperatures are -26.4°C and -35.3°C. Pond Inlet receives a total of 145.3 mm precipitation yearly. Of this, 883.9 mm comes in the form of snow and 56.9 mm is rainfall. Prevailing winds are from the east and west and average 13 knots.

8. MUNICIPAL SERVICES

8.1 Water Supply

8.1.1 Source

Prior to the present method of supply, two systems were used. In the summer, Pond Inlet Creek was the source of water until freeze-up occurred in mid-September. During the winter, a lake located southeast of the community was utilized as the source. The present source is the same lake known as "Water Supply Lake". A supply line runs from the lake to a truck fill point in the hamlet (see aerial photos). This supply line is now nonoperational due to freezing problems. Water Supply Lake is located 4.5 km southeast of the hamlet. It is 3.4 m deep and has a capacity of about 113 million L. In 1979 an earthen dam was constructed at a low corner in the lake to increase its capacity at the same time the supply pipeline was built. As a result of the failure of the supply line, the water distribution point has been rendered nonoperational. Subsequently the water for community distribution, is now drawn directly from Water Supply Lake by the water delivery trucks. A typical analysis of the water source is as follows: (All values in mg/L unless otherwise noted.)

Parameters	Values
ph	6.70
Total hardness (as $CaCO_3$)	39.6
Total Alkalinity (as $CaCO_3$)	41.6
Apparent Colour (HZU)	33.9
Turbidity (FTU)	0.9
Chloride (as Cl)	5.6
Total Iron (as Fe)	0.34
Calcium (as Ca)	8.3
Manganese (as Mn)	0.022

(Sample taken March 22, 1983 for Environmental Health Officer, Health and Welfare Canada.)

The water is relatively high in colour, and during winter and early spring, some taste and odour problems are experienced.

8.1.2 Intake and Supply Line

The intake pipe extends 92 m into the lake. The intake line includes 150 m polyethylene, Series 45 "Sclaircor" pipe with a 37 mm return line. The intake consists of a 90° elbow with a screen at the end.

The water flows to the truck loading point through a transmission main. Specifications are as follows:

Length:	4290 m
Diameter:	150 mm
Material:	Polyethylene "Sclaircor" Series 160
Depth of Bury:	Min. of 700 mm
Insulation:	Polyurethane, 50 mm
Covering:	45 mil polyethylene

A 37 mm Polyethylene Series 160 recirculation line is enclosed in the transmission main. Heated water is pumped back to the lake to keep the line from freezing.

B.1.3 Water Distribution Point

When the supply line was operational, water flowed from the lake to the truck fill station by gravity. The only pumps used in the system were two recirculation pumps (one duty and one standby), and two truck loading pumps. Specifications are as follows:

Circulation Pumps (2 - one standby)
Type: Astral boiler feed pump model X2
Capacity: 7.6 L/s @ 1370 kPa TDH (100 Igpm @ 460' TDH)
Motor: 5.6 kW, 3-phase, 60 Hz, 600 volts, 750 RPM

Truck Loading Pump (2 - one standby)
Type: Peerless PV2-1/2 X 2-1/2 X 8 inline
Capacity: 7.6 L/s @ 60 kPa TDH (100 Igpm @ 30' TDH)
Motor: 0.75 kW, 3 phase, 60 Hz, 600 volt, 1750 RPM.

Chlorination was provided by a Wallace and Tiernan A-588 hypochlorinator. Sodium hypochlorite solution was used as the chlorine service. No other treatment was provided. Treatment now consists of adding bleach directly to the water in the delivery truck.

B.2 Water Distribution

Pond Inlet is served entirely by a trucked water delivery system, operated by the Hamlet. The Hamlet has two water trucks, both wheeled. Each has a tank capacity of 4540 L (1000 Igal). One tank has a 4540 L (1000 Igal) capacity and the other has a 9080 L (2000 Igal) capacity. The trucks deliver water to the individual residences, the nursing station, the hotel and the school three times per week. This frequency depends on individual water use and subsequent demand.

Household storage tanks vary in size from 205 L (45 Igal) to 1135 L (250 Igal). Heavy usage tanks are located in the school - 13,600 L (3000 Igal), the nursing station - 4540 L (1000 Igal), and the hotel 4540 L (1000 Igal).

B.3 Sewage Collection

As with most northern communities there are two types of sewage to be collected, bagged sewage, and liquid pumpout sewage. Both are collected by the Hamlet.

Sewage bags are placed on 204 L (45 Igal) drum shells (cut in half longitudinally) located alongside the roadway for collection by Hamlet employees. The bags are loaded into 204 L (45 Igal) barrels on the back of a F-250 stake truck to prevent spillage. Bagged sewage pick-up occurs approximately every second day.

Sewage pumpout is carried out by two 4540 L (1000 Igal) capacity pumpout trucks. Pumpout service is done by the Hamlet everyday, with each house having its sewage holding tank emptied 2 - 3 times per week. Houses with holding tanks have an access pipe with a knock-off cap. A suction line from the truck is inserted into the access pipe and activated by the truck mounted pump.

B.4 Sewage Disposal

Liquid pumpout sewage and bagged sewage are both disposed of at the dump site 0.6 km east of Pond Inlet. The bagged and pumpout sewage are separated from each other, as well as the other refuse located there. The pumpout sewage is emptied over a berm into a holding pond.

The valley is sloped directly down to Eclipse Sound and the sewage seeps to the the sea. Greywater from houses is deposited outside each house.

B.5 Solid Waste

Garbage is placed in 204 L (45 Igal) barrels outside each home. The garbage is collected approximately every second day by the hamlet, using a F-250 stake truck.

The solid waste disposal site is located 0.6 km from the community between two rock outcrops which make the backfilling process difficult, due to lack of backfill material.

Aside from burial, dump maintenance also includes burning every second day.

B.6 Roads

Many of the roads in Pond Inlet are in poor condition, mainly due to the large amount of sand in the subgrade material. The roads generally follow natural ground contours. This often impedes surface drainage and results in culverts being repeatedly washed away.

B.7 Surface Drainage

The ground conditions do not allow the greywater to be absorbed and dissipated very quickly. This results in the formation of ponds and puddles.

No defined drainage scheme exists at present and the random location of houses hinders natural drainage patterns to some extent.

B.8 Fire Protection

Fire protection in Pond Inlet consists of the following:

- call boxes throughout the community directly connected to a siren;
- a 1978 wheeled triple combination pumper capable of pumping over 34 L/s (450 Igpm); and
- a 14 man volunteer fire brigade.

B.9 Other Services

Other services include mail service and telephone communication provided by Bell Canada. Scheduled air service provides 2 weekly flights from both Frobisher Bay and Resolute. NCPC provides power from diesel generation facilities.

SOURCES OF INFORMATION

1. W.D. Buchanan Ltd., Report on the Water Supply & Waste Disposal, Pond Inlet, N.W.T., March 1978.

2. W.D. Buchanan Ltd., *General Development Plan, Pond Inlet, N.W.T.*, May, 1978.

3. Government of the Northwest Territories, Department of Public Works, *Contract Documents, Project: Water Distribution Point, Pond Inlet, N.W.T.*, May, 1979.

4. Government of the Northwest Territories, Department of Public Works, *Contract Documents, Project: Installation of Water Line, Pond Inlet, N.W.T.*, May, 1979.

5. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the Northwest Territories, Frobisher Bay, N.W.T., Personal Communications, June, 1983.

6. Korak, Paul, hamlet of Pond Inlet, Personal Communication, June, 1983.

7. Government of the N.W.T., Department of Local Government, *Sewage and Solid Waste Inventory Report, Pond Inlet.*

1. GENERAL INFORMATION

Name: Pond Inlet

Region: Baffin

Classification: hamlet

Code Number 700

Northern Community Index: 1.71

Annual Growth Rate (%) 3.0

Community Population:

Total: 705 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Water Supply Lake

Type: Lake

3. WATER TREATMENT

Type: Addition of Bleach

4. SOURCE PUMPHOUSE

Type: None

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 4.5

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: None

9. PIPED DISTRIBUTION AND COLLECTION

Type: Supply line to Truck Fill Station
(not used)

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	2 @ 4540 L	2 @ 4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	19430/yr. 21481/yr.	20409/yr.	23301/yr.	23301/yr.
Number of helpers	1	0	1	1
Helpers Wages $/hr	19430/yr.	---	19911/yr.	19911/yr.

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.59 Vehicle Freight Rate ($/kg): 0.87

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 0.6

Garbage Disposal Distance (km): 0.6 Honeybag Disposal Distance (km): 0.6

13. SEWAGE TREATMENT

Type: Holding Pond

14. SEWAGE DISPOSAL

Name: None
Type: Holding Pond

15. GARBAGE TREATMENT

Type: Burning/cover

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	BUILDING CATEGORIES				
	1	2	3	4	5
Number of Buildings	104	60	4	3	1
Persons Per Building	4.3 (E)	4.3 (E)	NA	NA	190
Water - Service	T	T	T	T	T
- Use (L/d)	274.6(a)	16.7 (a)	U	U	641.1(a)
- Container (L)	1135 (A)	204 (A)	6188	U	13500
Sewage - Service	PO	HB	PO	HB	PO
- Production (L/d)	274.6(a)	7.2 (a)	U	U	641.1(a)
- Container (L)	1135 (A)	30	U	30	U
Garbage - Production (m^3/d)	0.043(a)	0.043(a)	U	U	0.216(a)
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; HB - Honeybag Sewage; NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

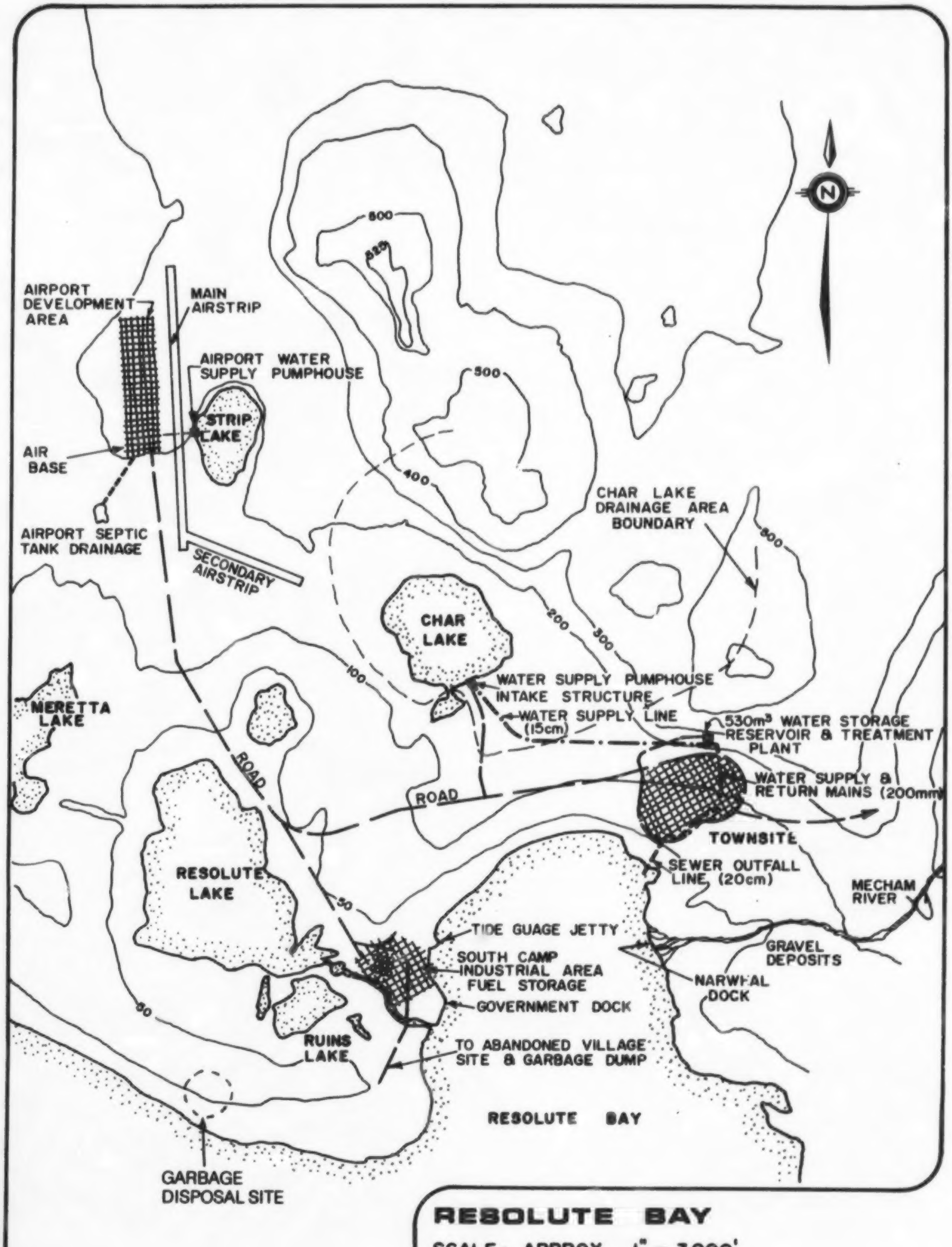
BUILDING CATEGORIES:

1. Residential with pressure systems.
2. Residential without pressure systems.
3. Nonresidential with pressure systems including: nursing station, HBC, Hotel, Hamlet Office.
4. Nonresidential without pressure systems, including: Government Office, Housing Association Office, Community Centre.
5. School

NOTES:

(a) Based on Data from Sewage and solid Waste Inventory Report, Pond Inlet, (See sources of Information)

Resolute Bay


AIRPORT DEVELOPMENT AREA
MAIN AIRSTRIP
AIRPORT WATER SUPPLY PUMPHOUSE
STRIP LAKE
AIR BASE
AIRPORT SEPTIC TANK DRAINAGE
SECONDARY AIRSTRIP
500
525
500
400
300
200
100
50
50
CHAR LAKE DRAINAGE AREA BOUNDARY
CHAR LAKE
WATER SUPPLY PUMPHOUSE INTAKE STRUCTURE
WATER SUPPLY LINE (15cm)
530m³ WATER STORAGE RESERVOIR & TREATMENT PLANT
WATER SUPPLY & RETURN MAINS (200mm)
TOWNSITE
SEWER OUTFALL LINE (20cm)
MECHAM RIVER
GRAVEL DEPOSITS
NARWHAL DOCK
MERETTA LAKE
ROAD
ROAD
RESOLUTE LAKE
TIDE GUAGE JETTY
SOUTH CAMP INDUSTRIAL AREA FUEL STORAGE
GOVERNMENT DOCK
RUINS LAKE
TO ABANDONED VILLAGE SITE & GARBAGE DUMP
RESOLUTE BAY
GARBAGE DISPOSAL SITE
N

RESOLUTE BAY

SCALE: APPROX. 1" – 3000'

DATE: APRIL /81

RESOLUTE BAY

A.GENERAL

A.1 Location

Resolute Bay is situated on the south shore of Cornwallis Island approximately 900 km north of the Arctic Circle. Its geographic co-ordinates are 74°41'N and 94°54'W. It is 1560 air km northeast of Yellowknife and about 1550 air km northwest of Frobisher Bay.

A.2 history

Cornwallis Island has been an occasional Inuit hunting and fishing area for over a thousand years. Parry first sighted the island in 1819, when he was searching for the Northwest Passage. Resolute Bay was named in 1850 after the ship "Resolute" which spent the winter there that year.

The airfield at Resolute was established in 1947 when the U.S./Canadian weather station was completed.

In 1953, Inuit from Port harrison and Pond Inlet were relocated there. In the last decade Resolute Bay has developed into a major transhipment point for supplying the petroleum exploration activities further north.

In the early 1970's, it was decided to relocate the Settlement from the beach area south of Resolute Lake to a new site as shown on the accompanying map.

A.3 Community Information

Resolute is classified as a Settlement. The population is relatively steady, with populations of 167 and 168 in 1978 and 1981 respectively.

There is a large increase in the summer during exploration activities and the sealift.

The main source of income for the residents is wage employment, supplemented by hunting and trapping activities.

One of the high Arctic's better airports is located at Resolute Bay. It consists of two gravel surfaced runways. One 60 m X 1980 m and a shorter crosswind runway of 45 m X 1220 m. The main strip is suitable for use by large jet passenger and transport aircraft.

P.W.A. provides scheduled air service to the settlement.

A.4 Geology and Terrain

Cornwallis Island is a part of the Innuitian Region in which most of the area has been worn down to a peneplained surface. The island is slightly domeshaped with the highest part at an elevation of 300 m or more, a little to the southeast of the geographical centre.

The shores of Resolute Bay are low and composed of Paleozoic limestone and shales. The land surface slopes gradually from the shore, generally in a series of steeped gravel ridges which appear to be raised beach lines.

Bedrock is located 1.5 m to 9.5 m below the surface. The depth of the active permafrost layer varies between 0.5 m and 1 m. The ice constant varies between 10% and 25% by volume.

A.5 Vegetation

Arctic tundra vegetation covers the area. Lichens grow on the rocky surfaces. During the summer, a few blades of grass manage to grow in the wetter areas around the lakes and streams.

A.6 Climate

The climate at Resolute Bay is typical of the cold dry Arctic environment. The mean daily high and low air temperatures for July are 7°C and 2°C. The January high and lows are -29°C and -36°C. The 137 mm total annual precipitation,58.7 mm, comes in the form of rain and 787 mm is deposited as snow.

B. MUNICIPAL SERVICES

B.1 General

The new townsite is served by a utilidor system with Char Lake as the water source. The buildings at the air terminal and administration area are served by a piped pressure distribution system from Strip Lake. The south camp and buildings at the airport that are not on the piped systems are served by truck delivery.

B.1.1 Source

The source of water for the townsite is Char Lake located approximately 1.5 km west of the townsite. The buildings by the airport receive their water from a small lake located across the runway known as "Strip Lake".

Both of these sources provide an acceptable quality of potable water. A chemical analysis of a sample from Char Lake is as follows: (All values in mg/L unless otherwise noted)

Parameters	Values
ph	7.74
Total Hardness (as $CaCO_3$)	118.2
Total Alkalinity (as $CaCO_3$)	104.0
Apparent Colour (HZU)	4.8
Turbidity (FTU)	1.50
Chloride (as Cl)	18.0
Total Iron (as Fe)	0.14

(Sample taken September 22, 1982 for Environmental Health Officer, Health and Welfare Canada).

B.1.2 Intake Facilities

A causeway, intake line and pumpwell has been built into Char Lake to place the intake in a minimum water depth of 4 m.

At Strip Lake, a similar gravel causeway has also been built into the lake. An intake structure and pumps have been built to deliver water by insulated pipeline to tanks in a storage building at the airport complex.

8.1.3. Treatment

Chlorination is provided by dual hypochlorite solution injector pumps (one for standby) located at the water treatment and storage facility.

8.1.4 Storage

An above ground insulated steel reservoir is located on a hill north of the townsite. Its 530,000 L (116,586 Igal) capacity was designed to provide for peak hour and fire demands. It is capable of meeting a fire demand of 4400 L/min (968 Igpm) for two hours.

The reservoir is situated at an elevation sufficient enough to provide distribution main pressures by gravity.

8.1.5 Pumping Facilities

The vertical turbine pumps are installed in the pumpwell. They are automatically controlled to operate on demand, based on the water level in the reservoir. The pumps are capable of supplying the maximum daily requirements of the townsite. Requirements are based on a population of 900 with an average demand of 320 Lpcd, with a maximum daily demand of 640 Lpcd and a peak hourly demand of 1280 Lpcd.

A shallow buried 150 mm urethane inuslated polyethylene pipeline supplies water to the reservoir from Char Lake. A 75 mm diameter insulated return line is buried alongside the supply line in the same trench.

8.2 Water Distribution

8.2.1 Piped System

The townsite is fully serviced by a shallow buried water and sewer utility system.

The 200 mm insulated polyethylene transmission main forms a single loop with continuous recirculation. The pumps are located at the storage facility. Boilers are used to maintain adequate water main temperatures and prevent freezing.

Pressure between 400 and 670 kPa is provided by gravity from the reservoir. The water mains are sized to provide for a combined fire demand and peak hourly flow at 5400 L/min while maintaining a residual pressure of 140 kPa.

The 20 mm copper lines into the houses are set in an insulated house service bundle. Two lines with two pitorifices allow circulation by the velocity head between the two.

Electrical heat tracing was installed for emergency purposes in the mains, but not in the service connections. hydrants are placed at strategic points for fire protection purposes.

The buildings at the terminal and administration area are served by a piped distribution system.

Consumption at the airport is estimated at 30,000 L/day.

Between October, 1977 and October, 1978, the average water consumption was 264 Lpcd (58 Igpcd) with about 150 persons on the piped system and 50 in trucked pressure system. The consumption rate varied from 209 Lpcd (46 Igpcd) to 346 Lpcd (76 Igpcd) in the winter when bleeding of water lines took place.

B.2.2 Trucked System

The south camp and buildings at the airport that are not on the piped system are served by a wheeled tanker truck of about 9080 L (2000 Igal) capacity under private contract, to Narwhal Arctic Services. The water used for the trucked delivery is from the piped system at the airport. The airport water storage building serves as the truckfill point.

B.3 Sewage Collection

B.3.1 Piped System

Sewage collection in the townsite is by gavity pipe collection forming part of the shallow buried system with the water mains. The sewer collection system utilizes urethane insulated, electrically heat traced polyethylene piping. The service line to the households is 100 mm diameter Series 60 HDPE. The main sewer line through the community is 150 mm, is wrapped with insulation and is protected by an outer plastic skin. The minimum design grade used for the 150 mm pipe was 0.6%.

B.3.2 Trucked System

Liquid pumpout sewage is collected from holding tanks from buildings not connected to the piped system. These buildings are primarily located at the South Camp and the Airport. Sewage is collected using a 9080 L (2000 Igal) capacity pumpout truck. This service is contracted out to Narwhal Arctic Services.

B.4 Sewage Disposal

B.4.1 Piped System

Sewage is presently untreated except for comminution prior to discharge into the bay. The outfall pipe is located at the shore of the Bay at the high tide water edge. It consists of a 200 mm polyethylene pipe wrapped with insulation and protected by an outer plastic skin. The last 3 m is contained in a 380 mm corrugated steel pipe, and the end is covered with a steel plate. An oval opening allows sewage to spill onto a long downward sloping concrete surface.

Sewage from the airport complex is conveyed to a holding tank. The effluent from the tank discharges into the water course of the upper reaches of the Meretta and Resolute Lake system.

B.4.2 Trucked System

Liquid pumpout sewage is disposed of by the contractor at the M.O.T. garbage dump, approximately 5 km northwest of the South Camp. The liquid sewage is separated from the solid refuse. Treatment of the sewage at the dump consists of the application of lime and cover with gravel in the summer. This work is done by the contractor.

B.5 Solid Waste

B.5.1 Collection

Garbage is placed in 204 L (45 Igal) drums outside homes for pick-up. Collection is done by the Settlement Council approximately every second day. A F-250 stake truck is utilized by the Settlement for collection.

B.5.2 Disposal

The disposal site is located approximately 7 km southwest of the community site. There is adequate loose gravel and rock material available to cover the wastes on a regulat basis. Other dump maintenance carried out by the Settlement consists of weekly burning.

B.6 Roads

Roads in Resolute Bay are gravel surfaced and are built-up above the surrounding surface to discourage creation of snowdrifts. Roads are graded so that slopes are 7% or less. The roads in the community have surfaces 8 m wide with 15 m rights-of-way.

B.7 Surface Drainage

There are no serious drainage problems in Resolute Bay due to the gravelly nature of the surface layer. The porous nature of the soil elimates most ponding problems. Site grading allows for adequate drainage and culverts are used as required.

B.8 Fire Protection

Fire protection in Resolute Bay consists of the following:

- one 1972 tracked mini-pumper capable of pumping 11-34 L/s (150 - 450 Igpm); and
- a 10 man volunteer fire brigade.

B.9 Other Services

Other services include twice weekly mail service, a bi-monthly newspaper, telephone service by Bell Canada, and a bank. NCPC provides power with diesel generating facilities.

SOURCES OF INFORMATION

1. Underwood McLellan & Associates Ltd., General Development Plan, Resolute Bay, N.W.T., December, 1977.

2. Underwood McLellan & Associates Ltd., Report on Study of Pollution Control Systems, Resolute, N.W.T., September, 1974.

3. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the Northwest Territories, Frobisher Bay, Personal Communication, June, 1983.

4. Settlement Secretary, Settlement of Resolute Bay, Personal Communication, June, 1983.

5. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Resolute Bay.

1. GENERAL INFORMATION

Name: Resolute Bay

Region: Baffin

Classification Settlement

Code Number 704

Northern Community Index: 1.77

Annual Growth Rate (%) 3.0

Community Population:

Total: 168 Year: 1981

Piped: 126 Year: 1983

2. WATER INTAKE/SOURCE

Name: Char Lake (townsite)
Strip Lake (airport)

Type: Lake

3. WATER TREATMENT

Type: Chlorination

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): 1500

Trucked(km): 4.2(to South Camp)

6. COMMUNITY WATER STORAGE

Capacity (L): 530,000

7. WATER DISTRIBUTION PUMPHOUSE

Type: Yes

8. TRUCK FILL POINT

Type: Yes (at airport)

9. PIPED DISTRIBUTION AND COLLECTION

Type: Townsite-piped water and sewage

10. TRUCKED DISTRIBUTION AND COLLECTION

SERVICE

	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	9080 L	9080 L	NA m^3	5.2 m^3
Drivers Wages $/hr			---	
Number of helpers	0	0	---	0
helpers Wages $/hr	---	---	---	---

Distance Between Buildings (m): 15

Vehicle Fuel Cost ($/L): 0.55 Vehicle Freight Rate ($/kg): 0.87

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): 500
Trucked(km): 5

Garbage Disposal Distance (km): 7 Honeybag Disposal Distance (km): None

13. SEWAGE TREATMENT

Type: None

14. SEWAGE DISPOSAL

Name: Resolute Bay
Type: Ocean Outfall

15. GARBAGE TREATMENT

Type: Burning/yearly cover

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: None

COMMUNITY BUILDING INFORMATION	**BUILDING CATEGORIES**				
	1	2	3	4	5
Number of Buildings	50	U	9	37 (E)	1
Persons Per Building	2.5 (E)	42 (a)	NA	NA	51
Water - Service	P	T	P	T	P
- Use (L/d)	660 (b)	U	U	1875(c)	U
- Container (L)	NA	U	NA	U	NA
Sewage - Service	P	PO	P	PO	P
- Production (L/d)	660 (b)	U	U	1875(c)	U
- Container (L)	NA	U	NA	U	NA
Garbage - Production (m^3/d)	0.022(b)	0.022(b)	U	U	0.044(b)
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

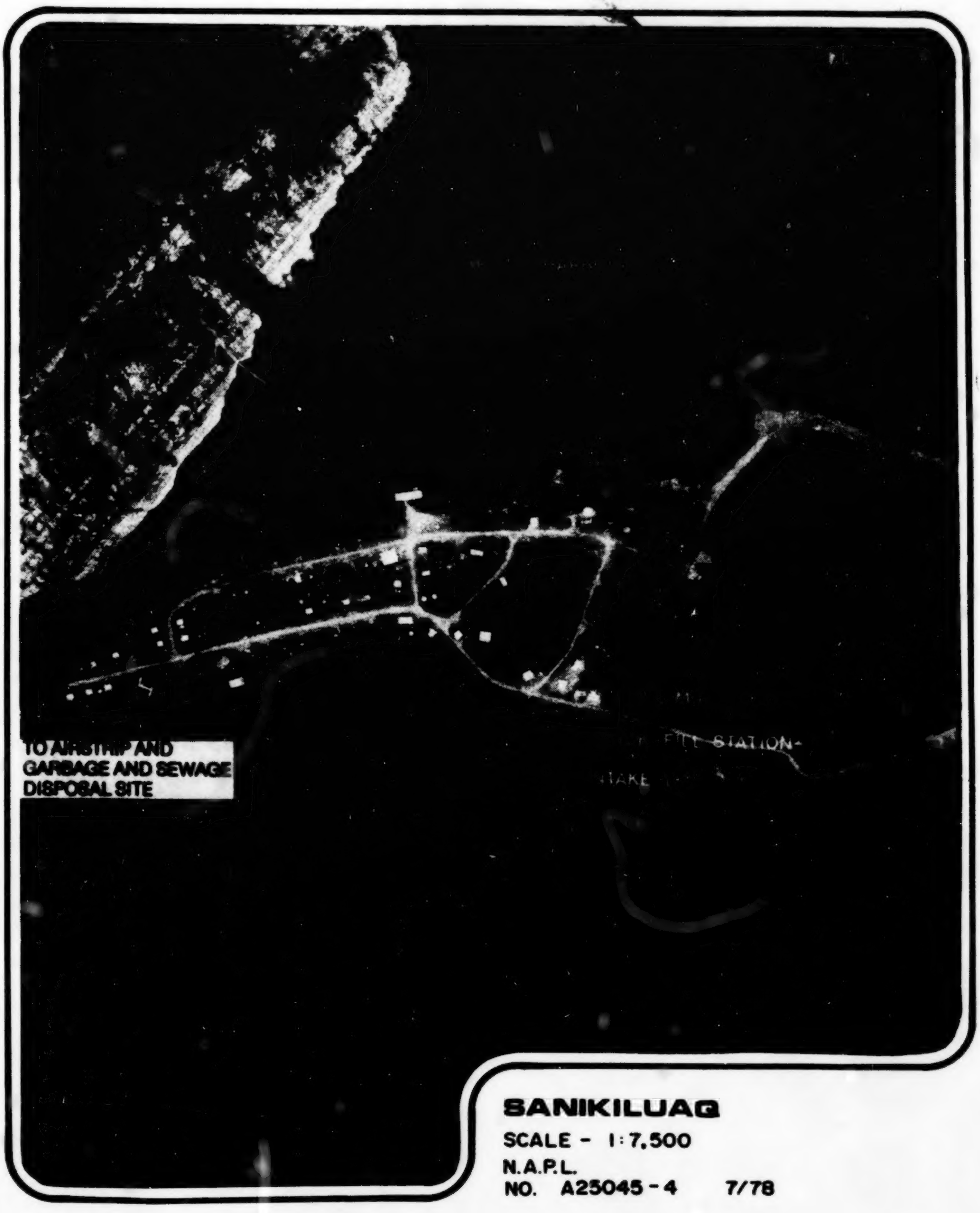
BUILDING CATEGORIES:

1. Residential on piped system.
2. Residential on trucked system.
3. Nonresidential on piped system.
4. Nonresidential on trucked system.
5. School.

NOTES:

(a) Number of people not on piped system.
(b) Based on Sewage and Solid Waste Inventory Report, Resolute Bay. (see Sources of Information.)
(c) This figure based on water use by airport buildings from Sewage and Solid Waste Inventory Report.

Sanikiluaq



SANIKILUAQ

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SANIKILUAQ

A. GENERAL

A.1 Location

Sanikiluaq is located at latitide 56°32'N and longitude 79°14'W, is 1024 air km southwest of Frobisher Bay and 1232 km northwest of Montreal. It is situated near the north end of Flaherty Island, a large central island of the Belcher Islands in hudson Bay.

A.2 history

The Belcher Islands were sighted and noted by henry hudson in the 1690's. Robert Flaherty published the first recognizable map of the area, from his explorations between 1914 and 1916. Sanikiluaq is the only permanent settlement on the Islands at present.

A.3 Community Information

Sanikiluaq achieved hamlet status on April 20, 1967. Between 1978 and 1981 the population of the hamlet grew from 326 to 383.

The economy of the community is based on wage employment by government institutions, hunting, fishing and handicrafts. Ring seals and ducks are the most common game. A gravel surfaced runway is located east of the settlement. It is 1160 m X 30 m in length and width.

A.4 Vegetation

Typical Arctic tunra vegetation, predominantly mosses and lichens, exists in this area.

A.5 Climate

The mean high and low temperatures in July are 25.6 °C and 3.3°C, respectively. The January mean high and low temperatures are -22.8°C and -42.8°C. The prevailing winds are from the northwest.

B. MUNICIPAL SERVICES

B.1.1 General

Prior to the construction of the present intake system, the water delivery truck obtained water directly from Lake Sanikiluaq. An improved system with intake and pumphouse was constructed in 1979.

B.1.2. Source

The source of the water supply is a large deep body of water known as Lake Sanikiluaq. It is located near the edge of the community. The chemical quality of the water is suitable for domestic use.

The following is a chemical analysis of raw pumphouse water: (All values in mg/L unless otherwise noted)

Parameters	Values
ph	5.9
Total Alkalinity (as $CaCO_3$)	82
Turbidity (FTU)	3
Chloride (as Cl)	70
Sulphate (as SO_4)	15
Nitrate (as NO_3)	<0.05
Total Iron (as Fe)	0.22
Manganese (as Mn)	0.15
Conductivity (umho/cm)	380

(Sample taken February 3, 1983 for G.N.W.T. by Oliver, Mangione, McCalla and Associates Limited.)

B.1.3 Intake Facilities

The intake extends approximately 141 m into the lake at a depth of about 5 m.

It consists of two pipes running from the pumphouse to a point below the winter ice level. here they combine to form one pipe running to the intake screen. Specifications are as follows:

	1st Section (2 pipes)	2nd Section (1 pipe)
Length	56 m	85 m
Diameter	250 mm	160 mm
Type	hDPE	hDPE
Series	100	125
Insulation	50 mm urethane	none
Freeze Protection	heat traced	none

The upper section is the portion of the intake most susceptible to freezing. Accordingly, two pipes are provided in this section such that if one does freeze than the second pipe may still be functional.

The intake screen consists of an all welded continuous slot construction screen with a capacity of 454 L/min (100 Igpm).

B.1.4 Treatment

Treatment consists of a Wallace and Tiernan Series A-745 hypochlorinator with a 227 L (50 Igal) polyethylene solution feed tank. This is located in the truck fill station at the edge of the lake.

B.1.5 Pumping Facilities

There are two identical submersible pumps in the intake facilities, one in each intake pipe. Pump specifications are as follows:

Type:	F.E. Myers & Bros. Co.
Capacity:	7.5 L/s @ 150 kPa TDh (100 Igpm @ 50' TDh)
Motor:	208 volts, 3 phase, 5 hP, 3500 RPM.

B.2 Water Distribution

Water delivery is provided by the Hamlet using two 4540 L (1000 Igal) capacity water trucks. Delivery occurs 2-3 times per week to each house.

B.3 Sewage Collection

Both bagged and liquid pumpout sewage are collected by the Hamlet. A 4540 L (1000 Igal) capacity sewage pumpout truck and a stake truck are utilized for these purposes. Each house is serviced daily for pumpout sewage and about every other day for bagged sewage.

Wash water is discharged directly onto the ground beside residences.

B.4 Sewage Disposal

Both bagged sewage and liquid pumpout sewage are disposed of in the same area at the garbage dump about 2.9 km west of Sanikiluaq. Liquid pumpout sewage is emptied into a holding pond at the site. Bagged sewage is placed on the ground near the holding pond.

B.5 Solid Waste

Garbage is collected by the Hamlet about 3 times per week from 204 L (45 Igal) barrels outside each house. A F-250 stake truck is used for this garbage collection. The dump site is 2.9 km west of the community. The area used for solid waste disposal is just north of the sewage disposal area.

B.6 Fire Protection

Fire protection in Sanikiluaq consists of the following:

- one 1971 tracked mini-pumper capable of pumping 11 - 34 L/s (150 - 450 Igpm); and
- a 9 man volunteer fire birgade.

B.7 Other Services

In Sanikiluaq, T.V. and radio are provided by the C.B.C. via the Anik satellite. Telephone service, local and long distance, is provided by Bell Canada, also via the Anik satellite. Power in the community is supplied by diesel generation facilities, with a capacity of 40 kW, of the Government of the Northwest Territories. Sanikiluaq receives scheduled air service via Great Whale and Timmins.

SOURCES OF INFORMATION

1. Health and Welfare Canada, Medical Services, N.W.T. Region, Report on Water Supplies and Wastes Disposal, Sanikiluaq, N.W.T., December, 1976.

2. Government of the Northwest Territories, Project: Water Supply, Hamlet of Sanikiluaq, N.W.T., May, 1979.

3. Douglas, Rick, Community Planning Officer, Department of Local Government, Government of the N.W.T., Frobisher Bay, Personal Communication, June, 1983.

4. Kittosuk, Lucassie, Secretary Manager, hamlet of Sanikiluaq, Personal Communication, June, 1983.

5. Government of the N.W.T., Department of Local Government, Sewage and Solid Waste Inventory Report, Sanikiluaq.

6. Oliver Mangione McCalla & Associates Ltd., Water Quality Study Sanikiluaq, N.W.T., March, 1983.

1. GENERAL INFORMATION

Name: Sanikiluaq

Region: Baffin

Classification hamlet

Code Number 901

Northern Community Index: 1.65

Annual Growth Rate (%) 3.0

Community Population:

Total: 383 Year: 1981

Piped: 0 Year: 1983

2. WATER INTAKE/SOURCE

Name: Lake Sanikiluaq

Type: Lake

3. WATER TREATMENT

Type: Chlorination

4. SOURCE PUMPHOUSE

Type: Yes

5. TRANSPORT FROM SOURCE

Distance: Piped(m): None

Trucked(km): 0.5

6. COMMUNITY WATER STORAGE

Capacity (L): None

7. WATER DISTRIBUTION PUMPHOUSE

Type: None

8. TRUCK FILL POINT

Type: Yes

9. PIPED DISTRIBUTION AND COLLECTION

Type: None

10. TRUCKED DISTRIBUTION AND COLLECTION

	SERVICE			
	WATER	SEWAGE	HONEYBAG	GARBAGE
TRUCK SIZE	2 @ 4540 L	4540 L	0.41 m^3	5.2 m^3
Drivers Wages $/hr	11.84	11.84	11.84	11.84
Number of helpers	1	1	1	1
Helpers Wages $/hr	9.95	9.95	9.95	9.95

Distance Between Buildings (m): 20

Vehicle Fuel Cost ($/L): ____ Vehicle Freight Rate ($/kg): 0.77

11. LIFT STATION

Type: None

12. TRANSPORT TO DISPOSAL

Sewage Disposal Distances: Piped(m): None
Trucked(km): 2.9

Garbage Disposal Distance (km): 2.9 Honeybag Disposal Distance (km): 2.9

13. SEWAGE TREATMENT

Type: Holding Pond

14. SEWAGE DISPOSAL

Name: Hudson Bay
Type: Holding Pond

15. GARBAGE TREATMENT

Type: Burning/cover

16. GARBAGE DISPOSAL

Type: Land

17. HONEYBAG TREATMENT

Type: None

18. HONEYBAG DISPOSAL TYPE

Type: Land

COMMUNITY BUILDING INFORMATION	**BUILDING CATEGORIES**				
	1	2	3	4	5
Number of Buildings	41	37	1	4	2
Persons Per Building	4.9 (E)	4.9 (E)	116	NA	NA
Water - Service	T	T	T	T	T
- Use (L/d)	421 (b)	U	U	U	U
- Container (L)	1135 (A)	204 (A)	3860 (a)	U	U
Sewage - Service	PO	hB	hB	hB	PO
- Production (L/d)	421 (b)	U	U	U	U
- Container (L)	1135 (A)	30	30	30	U
Garbage - Production (m^3/d)	0.053(b)	0.053(b)	U	U	U
- Container (m^3)	0.2	0.2	0.2	0.2	0.2

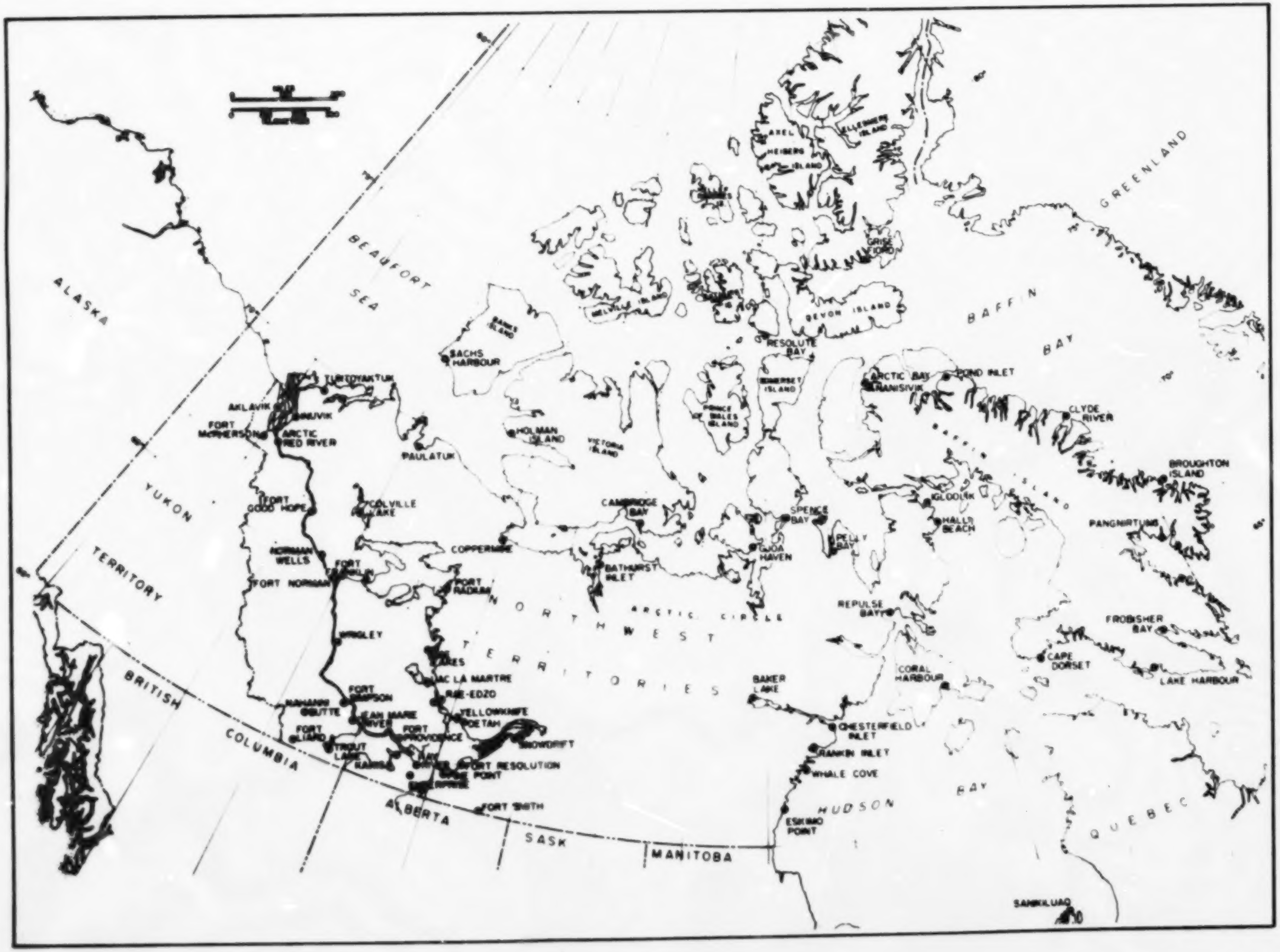
CODES: T - Trucked; P - Piped; PO - Pumpout Sewage; hB - honeybag Sewage;
NA - Not Applicable; U - Unknown E - Estimated; A - Assumed

BUILDING CATEGORIES:

1. Residential with pressure system.
2. Residential without pressure system.
3. School.
4. Nonresidential with pressure system.
5. Nonresidential without pressure system.

NOTES:

(a) Total combined capacity of all tanks in school.
(b) Based on data from Sewage and Solid Waste Inventory Report, Sanikiluaq, (See Sources of information)


ALASKA
BEAUFORT SEA
YUKON TERRITORY
BRITISH COLUMBIA
ALBERTA
SASK
MANITOBA
QUEBEC
GREENLAND
BAFFIN BAY
HUDSON BAY
NORTHWEST TERRITORIES
ARCTIC CIRCLE
AXEL HEIBERG ISLAND
ELLESMERE ISLAND
GRISE FIORD
DEVON ISLAND
RESOLUTE BAY
SOMERSET ISLAND
PRINCE OF WALES ISLAND
BANKS ISLAND
SACHS HARBOUR
VICTORIA ISLAND
HOLMAN ISLAND
BAFFIN ISLAND
ARCTIC BAY
NANISIVIK
POND INLET
CLYDE RIVER
BROUGHTON ISLAND
PANGNIRTUNG
FROBISHER BAY
CAPE DORSET
LAKE HARBOUR
IGLOOLIK
HALL BEACH
REPULSE BAY
CORAL HARBOUR
PELLY BAY
SPENCE BAY
GJOA HAVEN
CAMBRIDGE BAY
BATHURST INLET
COPPERMINE
BAKER LAKE
CHESTERFIELD INLET
RANKIN INLET
WHALE COVE
ESKIMO POINT
SANIKILUAQ
TUKTOYAKTUK
AKLAVIK
INUVIK
FORT McPHERSON
ARCTIC RED RIVER
PAULATUK
FORT GOOD HOPE
COLVILLE LAKE
NORMAN WELLS
FORT NORMAN
FORT FRANKLIN
FORT RAE
WRIGLEY
LAC LA MARTRE
RAE-EDZO
YELLOWKNIFE
DETAH
SNOWDRIFT
FORT SIMPSON
NAHANNI BUTTE
JEAN MARIE RIVER
FORT PROVIDENCE
FORT LIARD
TROUT LAKE
KAKISA
HAY RIVER
FORT RESOLUTION
PINE POINT
ENTERPRISE
FORT SMITH

POOR

QUALITY

ORIGINAL